



Army Information Technology Procurement: A Business Process Analysis

THESIS

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THESIS

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Abstract

The integration of Information and Communication Technology (ICT) is critical to the current and future success of the modern Network-Centric Warfighter. As one of the largest consumers of Information Technology (IT) hardware, software, and services in the world, the United States Army must be able to maintain accountability and visibility of the growing demand for IT at all echelons while efficiently delivering net-centric capabilities to the force. In 2013, the Army purchased over \$1.6 billion dollars in acquisition requests from sources other than Enterprise Procurement Vehicles (EPVs) which were ultimately approved for purchase through the Army Chief Information Officer (CIO)/G6 Goal 1 Waiver system. However, these requests did not provide enough information in a standardized form to enable decision makers to easily reprogram requests back into an EPV. As the number of waivers continues to grow, so does the burden of processing and the lack transparency in how resources are allocated.

This thesis presents a business process analysis of the Army's ICT procurement system. The research identified several inefficiencies and proposes several potential solutions. The contributions of this research include a unified taxonomy, a method to prioritize requests, and system architecture products for development of an automated and sustainable collaboration interface for the CIO/G6 to streamline their IT acquisition process. Development of a centralized system would reduce waste in the request process from submission to formal accounting, hasten the movement of requests between stakeholders, maintain a digital signature authorization for each approval authority, provide a reporting database to recognize reprogramming thresholds, and deliver relevant metrics and analysis for leaders to help inform Army's IT resourcing decisions.

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List of Terms

AEMP – Army Equipment Modernization Plan
AHP – Analytical Hierarchy Process
APE – Army Program Element
APMS – Army Portfolio Management Solution
ARPL – Army Resource Priority List
ARFIT – Army Request for Information Technology
ARFORGEN – Army Force Generation
CIO – Chief Information Officer
CHESS – Computer Hardware Enterprise Software and Solutions
CI/EOR – Commitment Items/Element of Resource
COTS – Commercial Off The Shelf
CMMI – Capability Maturity Model Integration
DA – Department of the Army
DISA – Defense Information Systems Agency
GFEBs - General Fund Enterprise Business System
GO – General Officer
DIACAP - DoD Information Assurance Certification and Accreditation Process
ELA – Enterprise License Agreement
EPV - Electronic Procurement Vehicle
ESA – Enterprise Service Agreement
FY – Fiscal Year
FIFO – First In First Out
IA – Information Assurance
ICT – Information and Communication Technology
IG – Inspector General
IT – Information Technology
ITIL – Information Technology Infrastructure Library
JCA – Joint Capability Area
MDEP – Management Decision Packages
NAV-IDAS – Navy Information Dominance Approval System
OMB – Office of Management and Budget
RDECOM – Research, Development and Engineering Command
ROC – Rank Order Centriod
SEI – Software Engineering Institute
SME – Subject Matter Expert

Army Information Technology Procurement: A Business Process Analysis

I. Introduction

General Issue

In 2010, the US Army spent in excess of \$15 billion on IT related products, programs, and services (ARFIT, 2013). We know the money was spent, but we have difficulty answering fundamental question such as: “What did we buy?”, “Did all of our purchases meet Information Assurance (IA) compliance requirements?”, “Did we make smart purchases?”, and “Are we being good stewards of tax payer dollars?” The urgency of war has clouded the answers to these questions, and in the years following Fiscal Year 2010 (FY10), the annual IT budget began to decline. The Army is now trying to maintain the level of IT support it has come to expect at a fraction of its FY10 budget. To this end, this research examines the evolution of the Army IT procurement process, why it isn’t working, and proposes phased changes to the procurement architecture that supports more effective service of Warfighter mission requirements while enabling the accountability and visibility required by decision makers and those who will be held fiscally responsible.

Creating a centralized IT acquisition system for the US Army is not an easy task. A decade of wartime urgency has made the IT needs of the Army mirror those of a commercial technology giant in the growth phase of its life cycle. Tactical units require cutting edge equipment to maintain real time battle space awareness in a package small enough for them to carry. The network enterprise needs constant hardware and software upgrades to feed the growing array of bandwidth hungry end user applications while

continuing to meeting security requirements. Reservists, National Guard, and Medical Corps all maintain their own independent networks, but require unrestricted access to the Land War Net when necessary. The Corps of Engineers has IT systems floating next to a dam this week, and next week it will be on a truck headed somewhere else. The diversity of operational requirements creates significant complexity when trying to create a single, centralized, and unified interface to handle IT acquisition.

To meet the initial surge of requirements, the Army turned to a ‘decentralized planning’ and ‘decentralized execution’ acquisition model as the means to keep pace with the IT centric needs of an organization with an array of diverse and dynamic missions. This model does, however, come with significant risks. The DoD standard for process improvement, Capability Maturity Model Integration, accurately predicted that this decentralized and expedited acquisition format would lead to a regression in an organization’s position in the Capability Maturity Model (CMMI, 2010). Processes that were once *quantitatively managed* have devolved to barely meeting the CMMI base criteria for *managed* processes. The regression is most visible in unit utilization of Enterprise Procurement Vehicles (EPV’s) such as Computer Hardware Enterprise Software and Solutions (CHESS). A unit commander is mandated to use CHESS for Commercial-Off-the-Shelf (COTS) IT needs. When CHESS is out of stock, does not support exact mission requirements, or cannot meet operational timelines, the commander can contract with another government source or a local vendor. The hardware or software however, hasn’t been vetted through security channels and may not meet DoD Information Assurance Certification and Accreditation Process (DIACAP) standards. This bypass also removes the automated purchasing record that enables the budget from

the Army Portfolio Management Solution (APMS) and the accounting in General Fund Enterprise Business System (GFEBS) to keep track of what we were doing with our money. This loss of accountability was a risk accepted by commanders to meet their wartime needs.

Army leadership and accountability organizations quickly recognized the security implications of this growing trend and acknowledged that the Army IT acquisition process needed a risk adverse reform to meet the postwar Army outlook on procurement. As a result, the CIO/G6's response was to reinforce the use of the Goal 1 Waiver system, a mandatory validation and approval process for local and non-IT budgeted funds. Since then, the Goal 1 Waiver system has become the consolidation point for everything that the EPVs cannot accommodate, and requests that require DoD or Office of Management and Budget (OMB) reporting. Goal 1 requests have grown exponentially since 2010, and in 2013 the total dollar value of approved Goal 1 Waiver requests surged to more than \$1.6 billion (Goal 1, 2014). The development of the Goal 1 Waiver system interface was designed from an already existing software project and was designed to function as a validation process managed by a small staff whose mission was to sign off on non-budgeted requirements. The system was never meant to process, analyze, or automate the IT needs of the entire Army.

Goal 1 Waiver Analysis

This research is focused upon conducting an objective analysis of the waivers in the Goal 1 system with the intent to identify trends that could create new contracts and push

requests back to the EPVs. An initial analysis of the 2013 waivers consisting of nearly 9000 lines of IT requests, found that a common problem was insufficient categorical data provided in the requests. This stems from the fact that the system was not designed to capture all of the information necessary to enable proper analysis and adjudication of the requests. While the existing system performs its primary function of verifying and validating user requests with a high degree of accuracy, it lacks the structure necessary to capture decision quality information. As a consequence, the underlying database is unable to provide actionable statistics on the nature of nonstandard Army IT requests due to the ambiguity of the required IT selection criteria. For example, while the general attributes captured by the existing system such as *funding*, *command*, and *IT Category*, appear to yield discrete actionable numbers at a broad level, analysis of the specific requests is nearly impossible. Table 1 below shows that in 61% of all 2013 submissions ‘Item Type’ was marked as ‘Other’ or left blank. Figure 1 shows that this lack of fidelity resulted in \$1,108,449,363 of non-standard Army IT requests which cannot be efficiently analyzed. There is clearly a need for the development of a new system that captures the required information in order to facilitate efficient analysis and provide decision makers with decision quality information summaries.

Table 1. Goal 1 Waiver Requests for 2013 (Goal 1 Query as of 2/7/2014)

IT Request	Total Requests	Uncategorized	Uncategorized \$ Requested
Hardware	4171	2448 (59%)	\$129,251,062 (35%)
Software	2738	1683 (61%)	\$62,033,088 (47%)
Services	1727	1135 (66%)	\$916,988,660 (81%)
Testing	38	20 (53%)	\$176,553 (14%)
Total	8674	5286 (61%)	\$1,108,449,363 (68%)

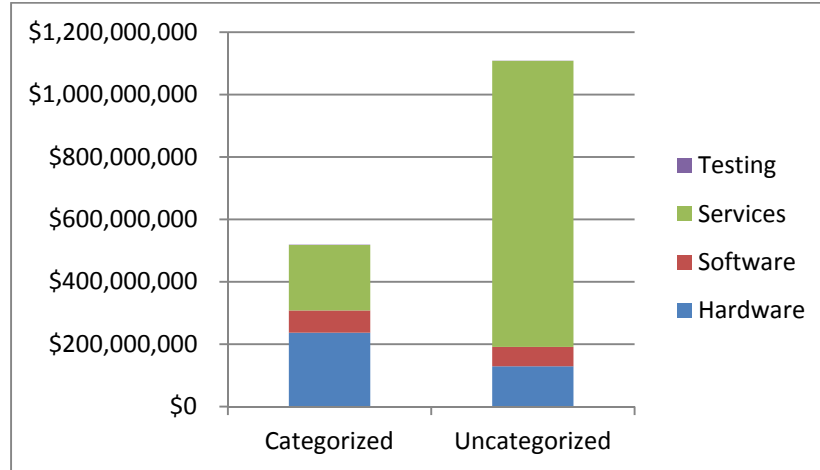


Figure 1. Total 2013 requested IT \$ by 'Item' Criteria (Goal 1 Query as of 2/7/2014)

Request Packages that cannot be addressed through Army CHES are by their nature varied and unique, and the existing 'Item' selection categories are structured in a way that a submission may meet multiple criteria. In a stratified random sample (by command) of the 2013 data, all submissions that met multiple criteria were marked as 'Other'. For example, funding for a system administrator to perform upkeep on an existing SQL server meets three 'Item' criteria and is marked as 'Other.' Expected duties are then explained at great length in the Description field. While the submission diligence was done to provide as much information as possible, this information must be entered in a standard format to provide value for anyone other than the approving authority.

The Goal 1 Waiver System and its staff cannot effectively process, analyze, and automate all Army IT acquisition needs. To continue using a small staff and an antiquated interface to perform these functions will only result in slower turnaround times and minimal reprogramming in to cost effective bulk purchases.

Problem Statement

Since the Goal 1 Waiver System staff cannot currently process and analyze the Army IT acquisition needs in an efficient, effective, or timely manner; this research seeks to understand the Goal 1 Waiver process, identify problems, and propose potential improvements.

Research Objectives

The goal of this research is to answer the question: “How can the Army improve visibility and accountability in the way it processes, manages, and reports Information Technology procurement?” In order to accomplish the stated goal of the research, we must accomplish several research objectives:

- Understand the existing process for Army IT procurement.
- Identify challenges that exist in the current IT procurement process.
- Investigate how the IT procurement process can be more responsive to the Warfighter.
- Investigate how the IT procurement process can provide senior leadership with decision quality information.
- Develop a road map to improve the IT procurement process based upon research findings.

Research Questions

The research objectives will be accomplished by answering specific research questions, each one focused upon a different aspect of the Army IT procurement process. Answers to the research questions will provide the necessary information necessary to meet the overall goals of the research. The research questions are as follows:

- **RQ1:** What is the existing Army IT procurement process?
- **RQ2:** What challenges have stakeholders identified with the existing Army IT procurement process?
- **RQ3:** How can the Army IT procurement process be more responsive to Warfighter IT needs?
- **RQ4:** How can the process for handling unprogrammed requests be improved within the Army IT procurement process?
- **RQ5:** How can budget projections and financial reporting be integrated into a single unified portal within the Army IT procurement process?
- **RQ6:** How can the Army IT procurement process be improved to provide senior leadership with decision quality information?
- **RQ7:** What next generation system architecture could improve the Army IT procurement process?

Methodology and Research Process

This research will be accomplished using a hybrid research methodology. A literature review and qualitative systems reengineering approach will be employed to understand the existing Army IT procurement process. Discussions with Subject Matter Experts (SMEs) will be conducted to validate the documented understanding of the existing system. A variety of stakeholders, all involved with some aspect of the Army IT procurement process, will be interviewed to identify barriers to efficient and effective management of Goal 1 Waivers. Based upon these discussions, a list of challenges will be developed to provide context during the development of proposed future solutions. A review of IT procurement best practices, both in the literature and in operation at other organizations, will be conducted and used to produce a comparative analysis and identify possible opportunities for improvement. A detailed look at existing Army policy and doctrine will be conducted to assure any proposed solution is in alignment with higher level strategic direction and terminology. Based upon the findings, synthesis will be used to combine finding and to propose a flexible service architecture that seeks to address short falls in the existing Army IT procurement process.

Assumptions/Limitations

As in any research endeavor, the research findings presented in this thesis are subject to several assumptions and limitation. A key assumption in this research is that all of the information and data provided by the research sponsor is correct and that stakeholders and SMEs provided accurate assessments of the existing system. Limitations of this research include the limited amount of time available to complete the research;

limited access to stakeholders, and SMEs; limited authority to implement business process improvement recommendations; and the requirement to integrate legacy systems into any next generation solution.

Implications

This thesis aims to provide solutions that will enable more efficient, effective, transparent and timely processing of Goal 1 Waivers and improve the overall Army IT procurement process. If successful, the proposed changes will save time, money, and resources; provide better service to the Warfighter and the Army at large; and provide the means for long term integration of the needs of all relevant stakeholders.

Document Preview

This thesis consists of eight chapters. In this chapter, an overview of the research problem was presented. Specific research objectives were identified and research questions were stated. Chapter II provides a review of literature related to the problem and provides relevant background information necessary to conduct the research. Chapter III presents the research methodology used to answer the research questions and provides a summary of the presentation format of the research. Chapters IV and V contain journal articles submitted for publication in the Army Communicator journal which answer several of the stated research questions. These articles concisely state the problem and present insight into potential solutions. Chapter VI presents the development of the prioritization scheme proposed to address inefficiencies in the existing Goal 1 Waiver approval process. Chapter VII presents a proposed system architecture developed

to resolve problems identified in the existing system. Finally, Chapter VIII presents the conclusions, summarizes the major findings of the research, and provides recommendations for future research.

II. Literature Review

Chapter Overview

Qualitative research for creating an appropriate procurement process begins with investigating broad scope IT procurement practices and becomes more refined as it addresses the specific needs of the US Army. Best practice for IT procurement in large organizations is an essential element to this research and commercial standards must be considered before delving into DoD specific processes. DoD IT and procurement guidance establishes system architecture framework, while Army policy and guidance serve as the primary driver for decision making to support the customer. Existing Army data and IT procurement implementations by adjacent organizations provide real world comparisons for applicability and serve as test results for how to improve upon previous implementations. Finally, selecting appropriate mathematical models is critical to ensuring the underlying algorithms support high value decision making.

Relevant Research

The DoD Joint Capability Area defines the activities performed by the DoD and functionally groups them in order to support capability analysis, strategy development, investment decision making, capability portfolio management, and capabilities-based force development and operational planning. (JCA 6.2, 2011). Identifying the capabilities Army IT procurement supports, and the capabilities that enable it, is critical to establishing the foundation of a process that focuses on accomplishing the goals of the Army as it supports those of the DoD.

The DoD Inspector General's (IG) office conducted a review of the Army's IT business systems and determined the enterprise resource planning systems to be inadequate (IG IT Review, 2013). The review articulates a need to eliminate legacy interfaces, enable cost-informed governance, improve efficiency and effectiveness of business operations, and align business process to operational forces as well as DoD policy.

CMMI® (Capability Maturity Model® Integration) models are collections of best practices that can be used to help organizations to improve their processes. These models were developed by product teams with members from industry, government, and the Carnegie Mellon® Software Engineering Institute (SEI) (CMMI, 2010). CMMI models have been created and applied across a wide range of disciplines. For example, the CMMI for Acquisition (CMMI-ACQ) model provides a comprehensive integrated set of guidelines for DoD contracts acquiring products and services.

Reengineering advocates reconstruction and redesign of organization process and norms to dramatically improve productivity and cut costs. Although the scope of this research is IT Procurement, it will consider the key ideas from "Reengineering the Corporation: A Manifesto for Business Revolution" (Reengineering, 2003), to allow radical redesign of organizational processes to optimize business focus. When reengineering is not feasible, as in the case of existing organizational architectures beyond the scope and authority of this research, Lean Thinking principles will focus on maximizing customer value and minimizing waste. "Lean Thinking: Banish Waste and Create Wealth in your Corporation" (Lean, 2003) will serve as a foundation for Lean principles.

The Information Technology Infrastructure Library® (ITIL®, 2012), is an IT industry standard set of practices that focuses primarily on providing and managing IT services. This research will consider how ITIL best practices for knowledge management and IT operations management processes may provide value to the Army construct.

The U.S. Research, Development and Engineering Command (RDECOM) is a technology development organizations that focuses on the long term development and integration of the technology driven Warfighter. RDECOM examines System of System (SoS) architectures (SoS, 2014) and published a strategic plan to enable battle field dominance through 2040 (EBTT, 2014) that could provide insight into adaptable procurement processes.

The Army Request for Information Technology (ARFIT) Plan establishes Army policy and processes for the procurement of all information technology hardware, software and services, without a cost threshold and regardless of the type of procurement. ARFIT creates a single integrated process consistent with the Clinger-Cohen Act of 1996, which requires responsibility, authority and accountability at all echelons, while giving visibility of all IT procurement at the enterprise level (ARFIT, 2013).

The Army G8 establishes Army policy to institutionalize the Army Force Generation (ARFORGEN) model and provides responsibilities for its execution based on the Army Force Generation (AR 525-29, 2011) regulation. Through ARFORGEN the Army G8 develops and publishes guidance such as the Army Equipping Guidance 2013 Through 2016 (Army G8, 2013) and the Army Equipment Modernization Plan (AEMP, 2014).

The regulation for Army Information Technology establishes policies and assigns responsibilities for information management and information technology. This regulation applies to IT contained in mission command systems; intelligence systems; weapon systems; business systems; and, when identified, national security systems developed or purchased by the Department of Army (DA) (AR 25-1, 2013).

The US Navy established the Information Dominance Approval System in order to provide a standardized and repeatable process to track IT-related acquisition procurement requests, ensure capabilities/mission requirements are met, and control cost and compliance, while allowing Navy decision makers to have enterprise visibility into the acquisition of IT assets and total cost. (NAVIDAS, 2014)

The Army CIO/G6 Goal 1 Waiver Database Reports (Goal 1, 2014) used to initiate this research provides real world data on existing Army Warfighter needs, and guidance for injecting user-focused efficiency into the Army acquisition process. The CIO/G6 also operates on guidance from General Fund Enterprise Business System (GFEBS) Commitment Items / Element of Resource (CI/EOR) (IT SOP, 2014).

Request prioritization is central to process efficiency, so common analytical methods for prioritization must be tested and fitted to determine the best fit for the Army procurement process. The Analytical Hierarchy Process (AHP) is a common technique for mathematical analysis of complex decisions with common application to prioritization of infrastructure renewal decision making (RESS, 2006), investment (AHP Analysis, 2013), and resource acquisition (AHP Acquisition, 2013). Value Focused Thinking (VFT) identifies and structures objectives quantitatively based on stakeholder objectives (VFT, 2014). Other methods of evaluation such as: Rank Order Centroid (ROC), Ratio

Method, Pairwise Comparison, Benefit/Cost Ratios, Real Option Analysis, Portfolio Decision Analysis, and Multi-Attribute Utility Analysis, were reviewed in accordance with Transit Cooperative Research Program Report 131 (TCRP 131, 2009), as methods by which weights can be assigned..

Summary

Commercial industry, the DoD, and the Army have an established a significant body of literature and resources needed to complete the research and answer the stated research questions. However, the specifics of any system reengineering implementation must be augmented with historical data and from those with relevant process experience with the Goal 1 Waiver process. In pursuit of the research objectives, historical data will be examined and discussions with the Army CIO/G6 staff stakeholders and Subject Matter Experts (SMEs) will be incorporated in order to truly understand the existing Goal 1 Waiver processes. The information gained from the analysis and discussions, presented in subsequent chapters, will help inform design tradeoffs made when proposing a next generation system architecture for handling the Goal 1 Waiver process.

III. Methodology

Chapter Overview

Processing and funding of IT requests is not unique to the Army, but IT procurement processes are difficult to standardize. Every organization, civilian or government, has a unique structure, budget, goals, priorities, culture, and size. Additionally, no single organization in the world has a customer base with the size and scope of the United States Army. Many elements within the Army operate as internal customers, while others could be considered autonomous were it not for their logistics and funding.

Solutions to these types of challenges are subjective, making a qualitative approach the most effective method to improve the way the Army processes and funds un-contracted Information Technology requests. This analysis will yield a short term solution to address immediate needs, a long term sustainable system for the Army to develop and advance, and a venue to educate in order to promote buy-in from the community of interest.

This research will be achieved by conducting a literature review of applicable Army CIO/G6 documents, Army and DoD policy and doctrine, and commercial standard and best practices. Army CIO/G6 Subject Matter Expert Interviews will provide insight into the unique needs of the Army and the specific requirements of the system. Business Process Reengineering principles (Hammer and Champy, 2006) will be applied to the gathered information, at which time Synthesis will be conducted to propose a short term and longer term solution to the challenges faced by the Army's IT procurement process.

Methodology and Research Process

Reengineering takes a clean slate approach that focuses on optimizing the business process to satisfy the needs of the customer and ignores the existing business process norms to include hierarchy, traditional authority structures, and departmental culture. Because of these social insensitivities, reengineering requires buy in from key personnel, and can take considerable time to implement if met by resistance from within. In general, reengineering changes require unification of purpose and momentum from higher levels of authority. The seven principles of Business Process Reengineering are as follows:

- Organize around outcomes, not tasks.
- Identify all the processes in an organization and prioritize them in order of redesign urgency.
- Integrate information processing work into the real work that produces the information.
- Treat geographically dispersed resources as though they were centralized.
- Link parallel activities in the workflow instead of just integrating their results.
- Put the decision point where the work is performed, and build control into the process.
- Capture information once and at the source.

In situations where reengineering is infeasible, Lean Thinking principles enable the optimization of existing processes through articulation of process value, and a cyclic process of reducing waste in the creation of process value.

This research will be achieved by using qualitative systems reengineering and lean thinking to:

- Understand existing system
- Enumerate challenges
- Identify IT procurement best practices
- Compare similar military organizations
- Identify unique Army requirements
- Propose a prioritization solution to resolve FIFO processing inefficiencies
- Propose a flexible service architecture to bridge budgeting (APMS) and finance (GFEBS) systems
- Inform the Army community of interest

Short Term Focus

- Address the needs of the dual customer: Mission support requirements for the requesting Warfighter, as well as the administration, funding, and strategy requirements of the US Army.
- Create a clear taxonomy for request packet prioritization fields relevant to Army business functions.
- Determine weighting criteria and formula to sort request packets by importance as determined by the Army.
- Design flexible prioritization format to allow for long term system sustainability and integration into any automated platform.
- Make a case to encourage procurement stakeholders to develop an Army-wide Unified Taxonomy for procurement, independent of software platform. The execution of this task is outside the scope of this research, but is identified as a critical system need for long term efficiency.

Long Term Focus

- Use system engineering principles to develop an architecture that can continue to provide value to the procurement process through organizational and IT evolution.
- Determine business process reengineering and business process improvement limits within the scope of existing architectures.

- Apply Lean principles where applicable.
- Improve delivery of useful information to decision makers at the least possible burden to the submitter.
- Provide a vehicle to qualify candidates for standardization
- Enable automated interaction with both budgeting and spending vehicles.

Community Buy-in

- Illustrate the mission environment that created existing IT procurement challenges.
- Explain why the existing system no longer works.
- Articulate the plan to improve the existing system
- Socialize information to the community through articles in a relevant Army publication.

Summary

Using a phased qualitative approach to addressing the short term needs of the Goal 1 Waiver system will support the long term development of a system architecture which will enable the CIO/G6 to yield relevant and repeatable solutions which are highly adaptable as IT procurement policies, guidance, and scenarios continue to change with the needs and goals of the US Army.

In the next two chapters of this thesis, articles submitted for publication to the Army Communication journal are presented to provide an overall context and initial finding of the research conducted in this thesis. The articles serve to communicate relevant issues to the community, answer some of the research questions, and provide a concise means to inform the reader and provide clarity of context needed for the reader to understand subsequent chapters.

IV. Towards the Next Generation Army Information Technology Procurement System: Part I

This chapter presents the first of two journal articles submitted to the Army Communicator Journal. The purpose of this article is to present the preliminary findings of research into the Goal 1 Waiver program, propose a short term method to prioritize requests, discuss the benefits of a unified taxonomy, and identify the administrative resources necessary to support the growing number of waiver requests.

Towards the Next Generation Army Information Technology Procurement System: Part I

MAJ Alexander Vukcevic, Michael R. Grimaila, and James N. Mark

Abstract

The integration of Information Technology (IT) is critical to the current and future success of the modern Network-Centric Warfighter. As one of the largest consumers of IT hardware, software, and services in the world, the United States Army must be able to maintain accountability and visibility of the growing demand for IT at all echelons while efficiently delivering net-centric capabilities to the force. In 2013, the Army purchased over \$1.6 billion dollars in acquisition requests from sources other than Enterprise Procurement Vehicles (EPVs) which were ultimately approved for purchase through the Army Chief Information Officer (CIO)/G6 Goal 1 Waiver system. Of these requests, \$1.1 billion were unable to be categorized in any way, and the remaining \$500 million that could be generally categorized did not provide enough information to reprogram any requests back into an EPV. As the number of waivers continues to grow each year, the Army CIO/G6 seeks to transform the Goal 1 Waiver system into a consolidated procurement interface intended to meet the IT management needs of the Army while providing a more effective acquisition process to the Warfighter.

In this article, we present the preliminary findings of our research into the Goal 1 Waiver program. We then propose a short term method to prioritize requests, discuss the benefits of a unified taxonomy, and identify the administrative resources necessary to support the growing number of waiver requests. Once the foundation has been set, we'll explore a potential automated collaboration solution for the CIO/G6 to streamline the IT acquisition process. This central tracking tool would manage the request process from submission to formal accounting, act as a transport mechanism for delivery to all stakeholders, a digital signature authorization for each approval authority, and a reporting database to recognize reprogramming thresholds to provide decision makers with relevant metrics and analysis.

Background

Technology is the cornerstone of battle space superiority in the information age and a decade at war has given the Army a ravenous appetite for IT equipment. In 2010, the US Army spent in excess of \$15 billion on IT related products, programs, and services (ARFIT, 2013). We know the money was spent, but we have difficulty answering fundamental question such as: what did we buy? Did our

purchases meet Information Assurance (IA) compliance requirements? Did we make smart purchases? Are we being good stewards of tax payer dollars? The urgency of war has clouded the answers to these questions, and in the years following Fiscal Year (FY) 2010 the annual IT budget began to decline. The Army is now trying to maintain the level of IT support it has come to expect at a fraction of the budget. To this end, we examine the evolution of the Army IT procurement process, why it isn't working, and propose phased changes to the procurement architecture that supports more effective service of Warfighter mission requirements while enabling the accountability and visibility required by decision makers and those who will be held fiscally responsible.

Creating a centralized IT acquisition system for the US Army is not an easy task. A decade of wartime urgency has made the IT needs of the Army mirror those of a commercial technology giant in the growth phase of its life cycle. Tactical units require cutting edge equipment to maintain real time battle space awareness in a package small enough for them to carry. The network enterprise needs constant hardware and software upgrades to feed the growing array of bandwidth hungry end user applications while continuing to meeting security requirements. Reservists, National Guard, and Medical Corps all maintain their own independent networks, but require unrestricted access to the Land War Net when necessary. The Corps of Engineers has IT systems floating next to a dam this week, and next week it will be on a truck headed somewhere else. The diversity of operational requirements creates significant complexity when trying to create a single, centralized, and unified interface to handle IT acquisition.

To meet the initial surge of requirements, the Army turned to a 'decentralized planning' and 'decentralized execution' acquisition model as the means to keep pace with the IT centric needs of an organization with an array of diverse and dynamic missions. This model does, however, come with significant risks. The DoD standard for process improvement, Capability Maturity Model Integration, accurately predicted that this decentralized and expedited acquisition format would lead to a regression in an organization's position in the Capability Maturity Model (CMMI, 2010). Processes that were once *quantitatively managed* have devolved to barely meeting the CMMI base criteria for *managed* processes. The regression is most visible in unit utilization of Enterprise Procurement Vehicles (EPV's) such as Computer Hardware Enterprise Software and Solutions (CHESS). A unit commander is mandated to use CHESS for Commercial-Off-the-Shelf (COTS) IT needs. When CHESS is out of stock, does not support exact mission requirements, or cannot meet operational timelines, the commander can contract with another government source or a local vendor. The hardware or software however, hasn't been vetted through security channels and may not meet DoD Information Assurance Certification and Accreditation Process (DIACAP) standards. This bypass also removes the automated purchasing record that enables the budget from the Army Portfolio Management Solution (APMS) and the accounting in General Fund Enterprise Business System (GFEBS) to keep track of what we were doing with our

money. This loss of accountability was a risk accepted by commanders to meet their wartime needs.

Army leadership and accountability organizations quickly recognized the security implications of this growing trend and acknowledged that the Army IT acquisition process needed a risk adverse reform to meet the postwar Army outlook on procurement. Consider the following concerns:

- *“The Army does not have a single integrated IT procurement process.” – **Auditing Agency and Inspector General audits***
- *“Underutilization of CHES contracts for IT procurement/visibility when waivers are granted” – **Assistant Secretary of the Army for Acquisition, Logistics, and Technology***
- *“Inability to link IT procurement/expenditure data to IT investment in APMS/GFEBS” – **Army CIO/G-6***
- *The CIO/G6 will “ensure visibility and accountability of all IT expenditures throughout the Army.” – **Secretary of the Army***

As a result, the CIO/G6’s response was to reinforce the use of the Goal 1 Waiver system, a mandatory validation and approval process for local and non-IT budgeted funds. Since then, the Goal 1 Waiver system has become the consolidation point for everything that the EPVs cannot accommodate, and requests that require DoD or Office of Management and Budget (OMB) reporting. Goal 1 requests have grown exponentially since 2010, and in 2013 the total dollar value of approved Goal 1 Waiver requests surged to more than \$1.6 billion (Goal 1, 2014). The development of the Goal 1 Waiver system interface was designed from an already existing software project and was designed to function as a validation process managed by a small staff whose mission was to sign off on non-budgeted requirements. The system was never meant to process, analyze, or automate the IT needs of the entire Army.

Goal 1 Waiver Analysis

Our research is focused upon conducting an objective analysis of the waivers in the Goal 1 system with the intent to identify trends that could create new contracts and push requests back to the EPVs. In our analysis of the 2013 waivers consisting of nearly 9000 lines of IT requests, we found that a common problem was insufficient categorical data provided in the requests. Our belief is that this stems from the fact that the system was not designed to capture all of the information necessary to enable proper analysis and adjudication of the requests. While the existing system performs its primary function of verifying and validating user requests with a high degree of accuracy, it lacks the structure necessary to capture decision quality information. As a consequence, the underlying database is unable to provide actionable statistics on the nature of nonstandard Army IT requests due to the ambiguity of the required IT selection criteria. For example, while the general

attributes captured by the existing system such as *funding*, *command*, and *IT Category*, appear to yield discrete actionable numbers at a broad level, analysis of the specific requests is nearly impossible. Table 1 below shows that in 61% of all 2013 submissions 'Item Type' was marked as 'Other' or left blank. Figure 1 shows that this lack of fidelity resulted in \$1,108,449,363 of non-standard Army IT requests which cannot be efficiently analyzed. There is clearly a need for the development of a new system that captures the required information in order to facilitate efficient analysis and provide decision makers with decision quality information summaries.

Table 1. Goal 1 Waiver Requests for 2013 (Goal 1 Query as of 2/7/2014)

IT Request	Total Requests	Uncategorized	Uncategorized \$ Requested
Hardware	4171	2448 (59%)	\$129,251,062 (35%)
Software	2738	1683 (61%)	\$62,033,088 (47%)
Services	1727	1135 (66%)	\$916,988,660 (81%)
Testing	38	20 (53%)	\$176,553 (14%)
Total	8674	5286 (61%)	\$1,108,449,363 (68%)

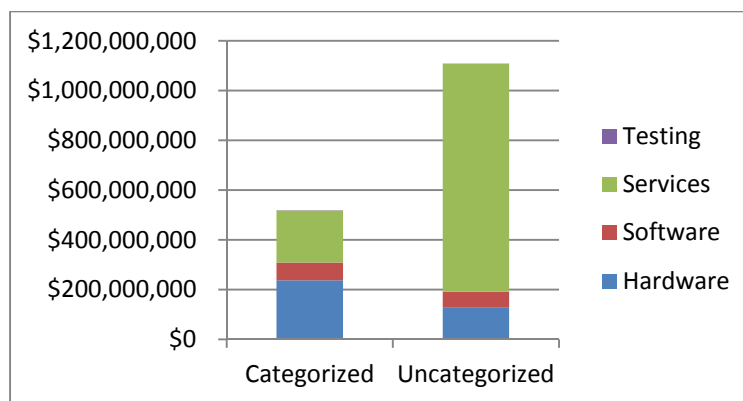


Figure 1. Total 2013 requested IT dollars by 'Item' Criteria (Goal 1 Query as of 2/7/2014)

Request Packages that cannot be addressed through Army CHES are by their nature varied and unique, and the existing 'Item' selection categories are structured in a way that a submission may meet multiple criteria. In a stratified random sample (by command) of the 2013 data, all submissions that met multiple criteria were marked as 'Other'. For example, funding for a system administrator to perform upkeep on an existing SQL server meets three 'Item' criteria and is marked as 'Other.' Expected duties are then explained at great length in the Description field. While the submission diligence was done to provide as much information as possible, this information must be entered in a standard format to provide value for anyone other than the approving authority.

The Goal 1 Waiver System and its staff cannot effectively process, analyze, and automate all Army IT acquisition needs. To continue using a small staff and an antiquated interface to perform these functions will only result in slower turnaround times and minimal reprogramming in to cost effective bulk purchases. In the remainder of this article we identify the short term needs of IT acquisition stakeholders, and propose near term changes. In the follow on article we will propose an automated and sustainable solution.

Short Term Reform Proposal

In order to remain flexible to the unpredictable landscape of contracted software platforms, this proposal will focus on the general elements necessary for a sustainable IT acquisition process. The scope of this proposal will focus exclusively on the development of a collaboration environment for processing requests, and will not address governance issues such as policy development, roles and responsibilities of adjacent organizations, and enforcement. The objectives of this proposal are to:

- Reduce average total processing time for all IT requests to less than 10 days.
- Accurately account for all IT funds spent throughout the Army.
- Reduce the amount of funds being placed on higher cost non-enterprise contracts.
- Maximize cost-effectiveness by empowering EPVs to remain relevant to the customer.
- Enable trend analysis, projections, and dynamic reporting for cost and procurement decision making.
- Minimize the use of non-standard equipment.

Figure 2 shows a modified Joint Capability Area (JCA) Capability View to illustrate what Capabilities IT Procurement uses to enable Enterprise Services, how they align with Army IT Procurement Objectives, and the Activities required to support them. The ultimate goal of this process is, “The ability to provide to all authorized users awareness of, and access to, all DoD information and DoD-wide information services” (JCA 6.2, 2011). In order to accomplish this task, the IT procurement process is expected to provide Accountability and Visibility using the standards set by Information Assurance, and Army Supply and Acquisition Regulations, while improving acquisition efficiency for the Warfighter.

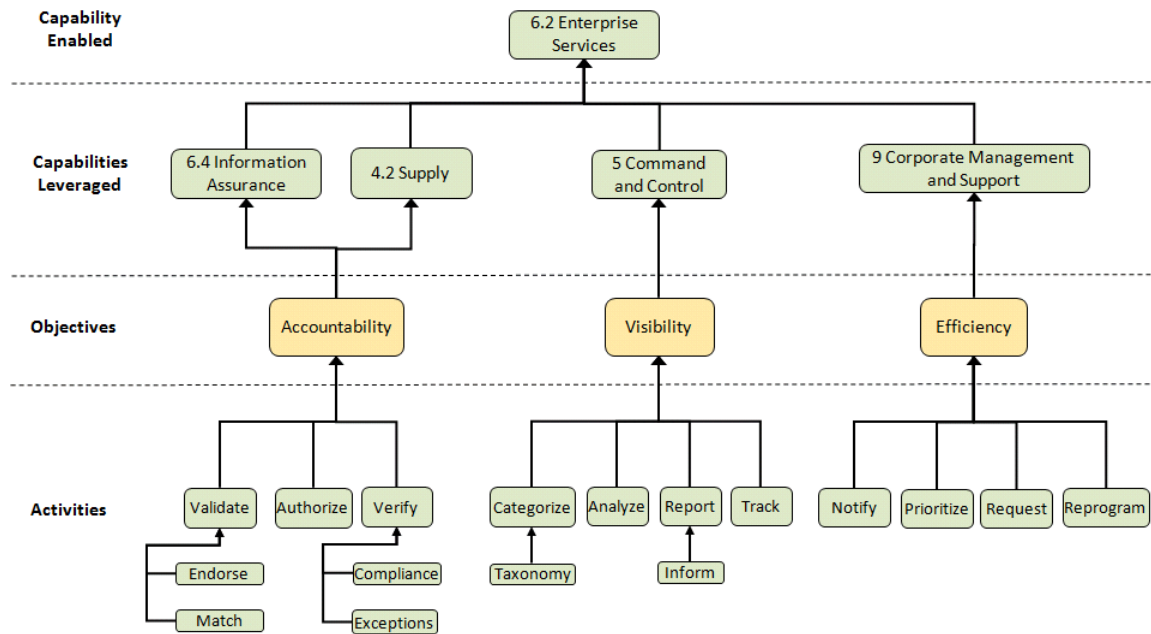


Figure 2. Modified Joint Capability Area (JCA) Capability, Objectives, and Activities View

Prioritization

The existing Goal 1 Waiver software interface is a simple, home grown platform. The database receives user submissions and employs a First-In-First-Out (FIFO) presentation of Request Packages for approval. It makes no consideration for what is in the package or who submitted it. Much like a SharePoint portal, it functions as a repository that requires the user to decide what is important. Before a long term solution can be implemented, the CIO/G6 must be able to sort thousands of Request Packages in which the ones of most value to the Army are addressed first. The long term goal is to continue reducing the number of exceptions until this weighting factor becomes virtually unnecessary. For now, criteria must be chosen to be weighted and associated with each Request Package to serve as triage. We have identified the following policy directed prioritization criteria as significant:

Army Mission Support (G3/5/7). Specific purchasing priorities will change every year, but the general capability priorities of the Army Resource Priority List (ARPL) published by the G-3/5/7 Force Management Directorate (AR 525-29, 2011) offer quantitative guidance on how to prioritize unit resource allocation to provide the greatest benefit to the Army. The four ARPL categories are: Expeditionary, Critical, Essential, and Enhancing. These categories would serve as an Army level update and replacement to the Risk Analysis for Army Property (DA PAM 190-51, 1991) guidance.

Unit Mission Criticality (DA PAM 190-51). The Army G8 equipping guidance (Army G8, 2013) and the annual unit IT transformation plan (IAW AR 25-1, 2013) will drive unit

purchasing priorities to meet strategic and mission goals. These guidelines primarily shape unit level focus, and can be easily categorized in accordance with the Risk Analysis for Army Property (DA PAM 190-51, 1991) evaluation factors for loss. However, instead of loss, the unit will categorize purchases as: Critical, Essential, Significant, Moderate, and Minor to evaluate the risks of non-acquisition.

Asset Replaceability (DA PAM 190-51). Time required to replace an asset is a strong metric for analysis when evaluating services that are considered “Always on.” DA PAM 190-51 uses cut offs of 5, 30, 90, and 180 days, but those time periods could provide more accurate value if adjusted to meet Service Level Requirements for the broad spectrum of services that could include anything from a switch replacement, to cable installation, to contracted portal access.

Total Cost of Ownership (DA PAM 190-51). Purchase price, lifetime operations and maintenance, and disposal all factor into this value. Existing guidance has qualified a \$25,000 minimum total cost of ownership as the minimum requirement for entrance into the system. Once at maturity, all IT requests will move through this system. Current price breaks of \$25,000, \$100,000, \$250,000, \$500,000 and \$1 million appear to be arbitrary round values, but do serve as valuable divisions when evaluated against requestor budgets.

Through analysis of the 2013 Goal 1 requests and collaboration with the Goal 1 staff, we have identified the following mission relevant prioritization criteria as significant to providing value to the prioritization process:

System State. This attribute would define the disposition of the IT Asset: New Acquisition, Life Cycle Replacement, IT Support, Upgrade, Maintenance, and Moratorium. This field would be applicable to all IT purchases, but may not provide priority value in all cases, or could be given temporary value depending on the operational environment. For example, the DoD issues a moratorium on server purchases at the same it directs a command focus to laptop life cycle replacement. By pairing the ‘Moratorium’ and ‘Life Cycle’ with IT Needs that would not generally hold weighting criteria, the multiplicative weighting now creates urgency in a unique combination of fields. If multiplicative weighting does not prove useful in practice, System State should, at a minimum, be part of the IT Asset Taxonomy.

O&M. As funding decreases, the Army seeks to reduce cost while retaining its wartime effectiveness. To accomplish this, we seek to outsource Operations and Maintenance of requirements that others organizations can perform more effectively, in order to focus on our core competencies. The IT contribution to this effort is to shift from purchasing hardware and software we maintain, to purchasing the services of hardware and software from adjacent organizations. In this vein, the Army can manage the level at which Army owned and operated purchases are favored. Similarly, this process can be given a multiplicative weighting from a latent IT Need field, that could allow tactical systems to enjoy a higher priority than virtual servers that are remaining in our enterprise architecture, ‘by exception.’

Time Sensitivity. This attribute would carry a sliding weight based on the mission need date. There is risk involved with adding a weight based on user perceived time requirement. However, AR 25-1 directs units to create annual IT transformation plans, which this system would eventually support as an annual unit IT procurement planning tool. The potential for abuse of this field would be mitigated by each of the following fields.

Time in Queue. This attribute would be continuously calculated in the same way as Time Sensitivity, and act as a balance for abuse of the previous field. The longer a request remains in the queue the more weighting it receives, while at the same time it approaches the stated Time Sensitivity date. This is intended to give more attention to lower priority requests that wait patiently at the bottom of the queue and run the risk of not being purchased in time. It also acts as incentive for commands to plan their purchases at the beginning of the year, as they are more likely to have their requests approved by the time they need their equipment.

Scope. Scope addresses the breadth of Soldiers, and civilians impacted by the Request Package. By considering who benefits from the purchase: Single Organization, Multi Command, Multi Installation, Army Wide, Joint, or Multinational. By weighting the Scope, we can account for technology such as 'Big Voice' which has a broad user base, but might not score highly on Army Mission Support.

Command. All commands in the Army inventory are not created equal. The CIO/G6 would weight commands based on their experience with managing IT procurement requests, and senior leader guidance. This weighting serves much like Scope, in that the greater area of influence will be taken into account, but should not be weighted so heavily that it becomes insurmountable to single unit mission critical purchases.

Commander's Flag. The current FIFO system has created a condition by which General Officers (GO)s are calling the CIO looking to advance their critical purchases through the line of thousands of requests. If analyzed and weighted correctly the above criteria should eliminate the need to bypass the system. However, the Commander's Flag acts as a mechanism for the GO to push a request to the front of the line by digitally signing this field. The Commander's Flag would hold an additive value equal for each command, meaning two requests with Commander's Flags would be at the front of the line in order of their original weighting. GOs would not be able to delegate this request signature authority, and be held accountable to the CIO/G6 for each use, giving this field a low potential for abuse.

The prioritization criterion listed above could be combined in many different ways to yield a single prioritized list and this is outside the scope of this paper. We have considered weighted summation of the criteria, rank ordered centroid weighting, and the Analytical Hierarchy Process (AHP) which allows multiple decision makers to provide input on the weights used in the prioritization.

Unified IT Acquisition Taxonomy

Once the prioritization process is established, the agreed upon language should serve as a starting point for the development of a Unified IT Acquisition Taxonomy used to provide fixed, concise, and relevant fields that allow the CIO/G6 to conduct detailed analysis of submissions, identify trends, project contracts for Enterprise License and/or Services Agreements (ELAs/ESAs), and seamlessly transfer data to budget and finance systems. Establishing a baseline of terms for all stakeholders decreases processing time between disparate organizations, and accelerates long term collaboration through identical language and database entries. Use of the taxonomy becomes the driver of process visibility through analysis. Analysis of the 2013 Goal 1 submissions enabled us to recognize that an effective

way to begin sorting attributes is to categorize them into Business Functions and IT Needs. In this context, *Attributes* would be defined as a selection taxonomy that identifies one submission from another in a discrete manner. *Bins* are defined as the list of possible codes within each attribute.

Business Function Attributes: These Attributes do not address the individual assets for purchase directly, as they are fixed bins that relate to the big picture analysis of fiscal and operational disposition. Each *Attribute* will have a single *Bin* selection. Request Packages in the Waiver process generally consist of more than one IT Asset being requested. At a higher level they will have many of the same Business Functions: Requesting Command, Scope, Purpose, etc., however, they may have different funding information, Appropriations, and Management Decision Packages (MDEPs), and Army Program Elements (APEs). Regardless, each IT Asset will have its own discrete selection within the larger Request Package. If a single IT Asset cannot be uniquely associated with a given business function the CIO/G6 must determine a way to separate them or accept the multiple selection criteria for the given field. If a discrete value cannot be given for each Business Function, the database must be modified to ensure the item is not misrepresented and where ever possible, Business Functions should be quantified by a discrete value.

IT Need Attributes: These Attributes should consist of discrete values in the broad categories, and decompose into highly specific, multi-criteria *Bins* that depict the customer need as accurately as possible. For example, the first tier Attribute may consist of: Tactical, Data Center, Office, or Infrastructure. The next tier may describe the device, but it is in the device specifications where units begin to diverge in their requirements. To maximize the analytical effectiveness of these requests, *Bin* selections at the lower tiers should not be unique within the *Attribute*, to allow submitters the option to 'select all that apply' and at the lowest level there will be the option for unique input in the form of a limited 'Other' option with a description requirement, to allow the system to grow and evolve based on the requestor's needs. With limited long term management the CIO/G6 could build relevant and accurate *Bins* comprehensive enough to only experience an 'Other' submission with emerging technologies.

Finance Centric Taxonomy. In an attempt to approximate the needs of the US Army we examined the Air Force and Navy IT procurement systems. The Air Force currently operates in a similar decentralized system. The Navy, however, has recently consolidated their non-weapon system IT procurement into the Navy Information Dominance Approval System (NAV-IDAS). The intent and scope of this contracted software suite is similar to that of the Army Request for Information Technology (ARFIT) process. NAV-IDAS functions as intended, but the Navy faces the challenge of integrating their financial tools into the procurement interface. The Army has an opportunity to learn from this challenge by integrating APMS and GFEBS into the early stages of process restructure. By building an IT procurement tool with budgeting and accounting at its core, the Army would maximize its ability to build a fully integrated collaboration tool, while priming it for migration and consolidation into the financial core at any point in the future.

Staffing

Once the new taxonomy and menus are in place, the overwhelming number of Goal 1 Waivers currently awaiting approval in the system would be 'incompatible' with new requests. The old requests could be separated and dealt with manually, or

users could resubmit unapproved waivers into the newly revised system. In either case, the CIO/G6 would require a temporary staff of IA and IT experienced personnel to expedite existing Waivers while ensuring they all meet compliance requirements. This staff would remain available into the next stage of the process when the system would begin grouping requests and diverting them back to approved EPVs. A Web designer could build a user friendly drop down menu interface, and implement prioritization algorithms. All programming should be 'lightweight' and built to be easily migrated to another platform. Once the prioritization and taxonomy are in place, value-added analysis could begin. New procurement vehicle contracts could be identified, requests can be directed to interested parties more quickly, and the CIO could begin to perform their intended role in the ARFIT process, monitoring and analysis.

Conclusion

By creating a prioritization system, establishing a Unified IT Acquisition Taxonomy, and temporarily augmenting the CIO/G6 staff the Army can lay the groundwork for a fully automated collaboration tool. These short term changes are conceptual in nature, costing only man hours, and can easily migrate to any platform the Army determines most effective for the long term development of this collaboration process. In Part Two of this article we will propose a long term sustainable solution that meets the needs of both the Big Army and the Net Centric Warfighter.

Disclaimer

The views expressed in this paper are those of the authors and do not reflect the official policy or position of the United States Army, the United States Air Force, the Department of Defense, or the U.S. Government.

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Acronym QuickScan

AHP – Analytical Hierarchy Process
APE – Army Program Element
APMS – Army Portfolio Management Solution
ARPL – Army Resource Priority List
ARFIT – Army Request for Information Technology
CIO – Chief Information Officer
CHESS - Computer Hardware Enterprise Software and Solutions
CMMI – Capability Maturity Model Integration
COTS – Commercial Off The Shelf
DISA – Defense Information Systems Agency
GFEBS - General Fund Enterprise Business System
GO – General Officer
DIACAP - DoD Information Assurance Certification and Accreditation Process
ELA – Enterprise License Agreement
EPV - Electronic Procurement Vehicle
ESA – Enterprise Service Agreement
FY – Fiscal Year
FIFO – First In First Out
IA – Information Assurance
IT – Information Technology

JCA – Joint Capability Area
MDEP – Management Decision Packages
NAV-IDAS – Navy Information Dominance Approval System
OMB – Office of Management and Budget

V. Towards the Next Generation Army Information Technology Procurement System: Part II

This chapter presents the second article submitted to the Army Communicator Journal. The purpose of this article is to explore a potential automated collaboration solution for the CIO/G6 to streamline the IT acquisition process. This central tracking tool would manage the request process from submission to formal accounting, act as a transport mechanism for delivery to all stakeholders, a digital signature authorization for each approval authority, and a reporting database to recognize reprogramming thresholds to provide decision makers with relevant metrics and analysis.

Towards the Next Generation Army Information Technology Procurement System: Part II

MAJ Alexander Vukcevic, Michael R. Grimaila, and James N. Mark

Recap

In our last article, we identified the IT procurement challenges facing the US Army and discussed potential short term enhancements to the Goal 1 Waiver system to include request prioritization options, benefits of a Unified IT Acquisition Taxonomy, and administrative resourcing considerations. These suggestions could facilitate positive process reform and lay the ground work for a sustainable automated collaboration interface as proposed in Part Two of this article.

Long Term Collaboration and Automation

Once the restructure of the existing waiver system is complete we would be able to focus on efficiency. Army IT procurement is currently a cumbersome process. Requestors are required to manually gain approval from unrelated organizations with unique submission requirements, authorization criteria, and limited tracking tools. These interactions are time consuming, inefficient, and often frustrating exchanges that have the potential to provide the Army with considerable efficiency gains if reformed correctly.

By replacing the existing process with a highly automated collaboration dashboard, Army units could coordinate with all interested stakeholders through a single submission mechanism. The dashboard would provide real time tracking updates to all stakeholders of a given Request Package, to include individual IT Asset progress through the system. When a stakeholder completes the designated task, the dashboard would automatically route the request to the next stakeholder and generate an email notification for action. Units would be able to track who currently owns the action and for how long, what actions stakeholders have taken, and their comments in a format that would remove all ambiguity and could be briefed directly from the interface without transcription. Finally, stakeholders would be allowed custom interface options that would allow them to display and arrange request data in a way that best suits the needs of their organization. The formatting changes become transparent and adjacent entities, such as the DoD CIO would be able to query and review a request without the Army investing man hours in document conversion.

Army Service Broker

To further improve the efficiency of this concept, the Army would be best served to consolidate all IT service contracting into a single Army Service Broker. The Army Service Broker would be responsible for maintaining all existing contracts and act as the negotiating interface for new services with adjacent agencies such as the EPVs and the Defense Information Systems Agency (DISA). Not all service requests being processed through this dashboard would require Army level management, but all Army level contracts should pass through this gatekeeper to be vetted and standardized.

Software Platform

The Navy's organizational needs and procurement processes are more similar to the Army than any other organization available to this research. As such, the Navy's procurement platform, Navy Information Dominance Approval System (NAV-IDAS), would be a relevant model to pattern the Army's solution after while accounting for our unique requirements. The dashboard would build on the tools developed to mitigate the short term acquisition challenges outlined above. The most cost effective and software efficient solution would be to contract with an organization who has experience with this specific need and to build the dashboard into an existing Army funded platform. As the stakeholder with the most robust infrastructure, and most experience with custom software development, the Army financial platforms would be ideal. As we saw with NAV-IDAS, integrating IT Acquisition into Army financial processes from the beginning will maximize system efficiency, and mitigate any potential integration issues in the future.

Streamlined Purchase Process

In this section we will walk through the general use of this system from submission to acquisition. First, we will address the stakeholders in the "Happy Path," which is a Request Package and associated IT Assets that require no intervention and moves directly to purchase. Then, we will discuss stakeholders that become involved in the exception process.

The full work flow diagram for this process is included in the proposed CONOPS, but contains too many scenarios and routing activities for this article. This process is the intended end state for this stage of the system and looks to field no less than 90% of the IT requests submitted by the Army.

Request Packages. Each submission is considered a Request Package that may contain a variety of IT Assets needed to accomplish the mission. The Request Package as a whole must be approved for purchase prior to the acquisition of any IT Assets contained within. This dashboard would strive to help units meet the Army standard of submitting their annual IT

transformation plan (AR 25-1) by loading projected purchases into the system. Units would be rewarded for long term planning through the weighting criteria of the prioritization system. Though pricing and availability fields may become stale, they offer reference for planning and eventual purchase. At maturity, the robust submission menu should provide units with an exhaustive selection tool that eliminates the need for external document attachment.

Army Portfolio Management Solution (APMS). APMS provides value to this system by integrating APMS planning resources into the submission interface. Units can use their own projections to guide their requests and determine how much money they should spend, and through which funding streams, all in the interface they use to submit requests. Because of this integration, APMS authorization is a largely automated process. APMS will not have the authority to reject a submitted Request Package from being processed. If a request is not associated with a funding code APMS will merely annotate the unfunded requirement for stakeholders in the unit's chain of command to make a determination.

Enterprise Procurement Vehicle (EPV). Relevant EPVs would review the IT Assets in the package and determine what they can and cannot provide, and at what price. The disposition of each IT Asset would then be annotated within the Request Package in the Dashboard. Like APMS, the EPV will not stop a request whose requirements it cannot fill. Rather, it will send the IT Asset back to the requestor for an addendum of vendor quotes to be added to the request. The dashboard will only forward the total Request Package on to the Command once all required IT Asset information has been added.

Command. The requesting unit's command would make a determination as to whether it will approve the Request Package once all of the budgeting and availability information is accumulated. If the Command rejects the Request Package at this point the request would remain in the system as a value added data point of unit requirements, of Army process or financing shortfalls, and the reason for rejection. The rejected request is available in the database for analysis, and if the Command wishes to approve the request at a later date the process can easily resume.

Higher Command. The request then goes to the higher Army Command (ACOM), Army Service Component Command (ASCC), or Direct Reporting Unit (DRU) for approval. If the Request Package and its IT Assets are fully funded the command would digitally sign and send directly to GFEBS. If unfunded exceptions exist, this will be the first level of divergent action in the Exceptions sections below.

General Fund Enterprise Business Systems (GFEBS). Once all IT Assets in the Request Package are approved GFEBS commits and obligates the funds based on the taxonomy standards within the request and routes the request to the appropriate contracting office.

Exceptions

In this section we discuss Request Package gatekeepers and IT Asset sorting for exceptions. In isolation this section would be considered a direct modification to the existing Goal 1 Waiver process, which will now become a component of the larger request management system.

Higher Command. If an exception exists in a Request Package the Higher Command would be responsible for ranking requests by command wide priority, which would further

empower the CIO/G6 to address high value requests first. If an urgent request should arise the Higher Command also has the Commander's Flag authority discussed earlier to expedite the request.

CIO/G6. The primary function of the CIO/G6 in this process is to review exceptions for IA compliance, and conduct analysis on IT Asset exceptions that aren't being addressed through EPVs. At full system maturity the CIO/G6 should focus primarily on trends, projections, and contract forming with the Army Service Broker.

DoD CIO. The DoD CIO only enters this process for IT Asset requests that require DoD approval, such as moratoriums and specified purchase restrictions.

Hardware. The hardware approval process will remain unchanged. Request specifications will be reviewed and annotated for unique requirements that are not being met by EPVs, then approved if there are no compliance issues. Hardware may prove to be the hardest IT Asset category to standardize, and could maintain a long term place in the Exception process.

Software. The Software Exception process would be subject to the Army Applications/Systems Migration – Rationalization and Disposition Process (Under Secretary of the Army, Jun 2014). If the software meets the requirements of the modernization checklist it will be forwarded to the Army Service Broker for processing. If the software is determined to be temporarily sustained, short term licenses may be issued. If the software meets no requirements, the Request Package will be rejected until the software is removed or modified.

Army Service Broker. The Army Service Broker would become the gatekeeper for contract services which would accelerate the Army's intended migration into the cloud. The Army Service Broker would work closely with the CIO/G6 to determine what contract modifications or negotiations would be of the most benefit to the acquisition process, and to what degree.

General Fund Enterprise Business Systems (GFEBS). Once all IT Asset exceptions in the Request Package are addressed the Request Package is approved GFEBS commits and obligates the funds based on the taxonomy standards within the request and routes the request to the appropriate contracting office.

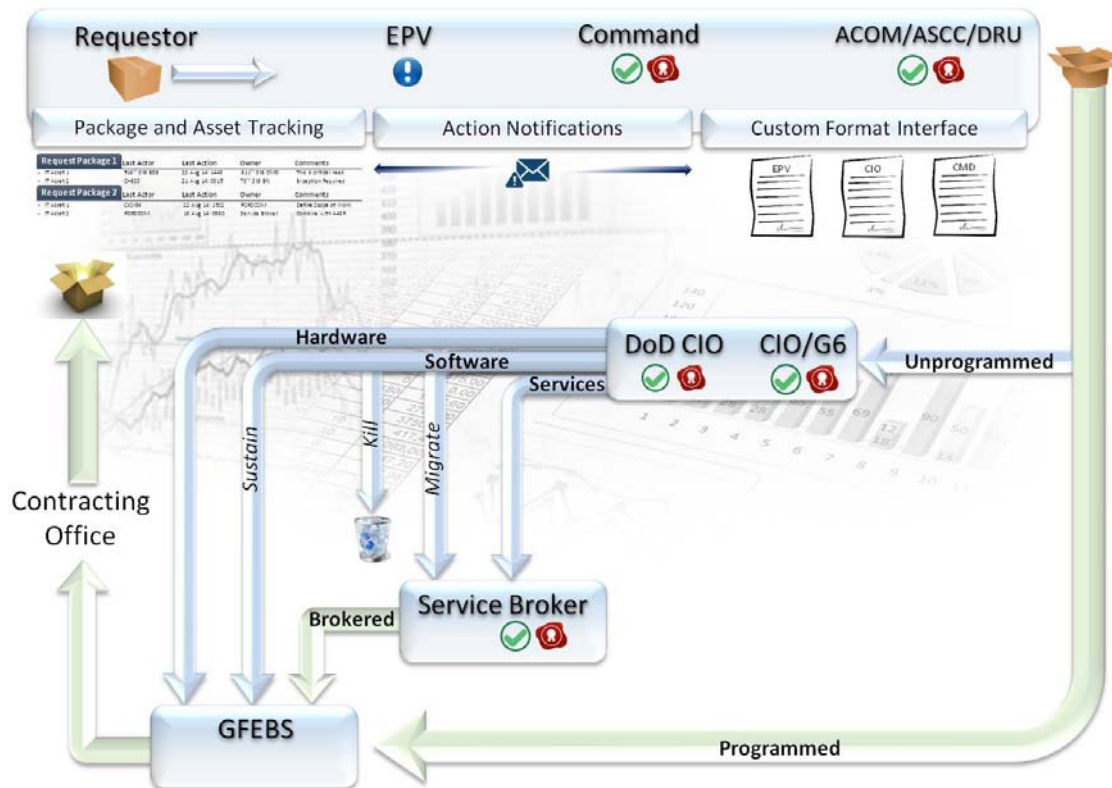


Figure 1. Proposed Work Flow

Analysis and Reporting

This consolidated process provides its greatest value to the Army in the form of IT metrics. Through real time database analysis the Army will be able to generate customizable and automated reports for financial accountability, trend analysis, program threshold triggers, value mapping, and any other analysis requirement that may arise in the future.

Financial Accountability. This system would serve as the connecting interface between Army APMS budgeting and the Army GFEBS spending mechanism until a long term integration solution could be agreed upon.

Decision Analysis Tools. The CIO/G6 would be primarily responsible for conducting the analysis of the consolidated database, but they would not have to build their tools from scratch. The Armament Analytics Multiple Objective Decision Analysis Tool (AAMODAT) is Value Based Analysis (VBA) tool designed for weapon procurement that could serve as a model for determining how the IT procurement process could achieve greater spending efficiency (AAMODAT, 2012).

Trend Analysis. The primary role of trend analysis would be to enable collaboration between the Army CIO/G6 and the Army Service Broker to make data driven decisions when

negotiating EPV contracts. With enough trend data the CIO/G6 would be able to project at what levels a program would need to be established, and set threshold triggers in the system that would provide an alert when criteria is met. In addition to these commonly tracked metrics, the Unified IT Acquisition Taxonomy would enable the Army to easily combine fields to generate a multifactor analysis based on unique need or interest without any modification to the system.

Value Mapping. As the database grows, priority factors will begin to trend in correlation to their total cost. This would eventually yield “soft” upper and lower limit bands for normal purchases. This value map could provide a guide to determine the cost effectiveness of any given request. This would not be hard cut off, but rather additional information for decision makers to consider when presented with a Request Package.

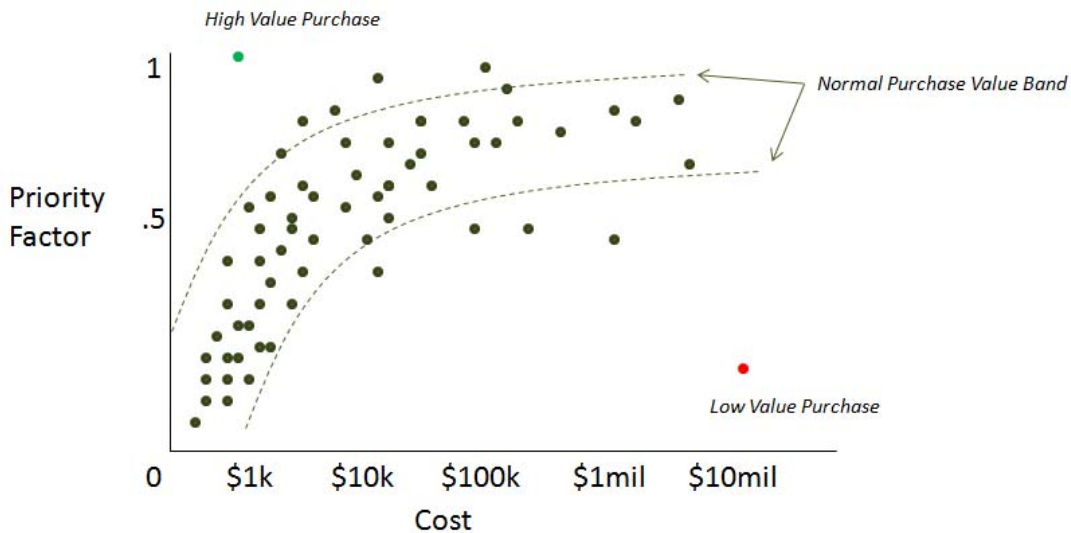


Figure 2. Value Mapping Example

Total Integration

The development of an IT procurement tool based on collaboration, automation, and consolidation has long term implications for how the Army allocates funds, spends, and balances its budget. By further integrating these once disparate processes, the Army purchasing and funding process becomes a Wiki of information, enabling any stakeholder to customize their view of the process as a Mashup, a single interface that pulls content from all sources to provide them an optimal view for their mission requirements.

Conclusion

In this article we discussed the IT Acquisitions challenges facing the Army brought on by a decade of war. We proposed one possible course of action for a prioritization system, a Unified IT Acquisition Taxonomy, and a temporarily augmentation of the CIO/G6 staff. This course of action would lay a foundation for the Goal 1 Waiver system to migrate into a fully automated collaborative procurement platform. This platform would provide the Army Warfighter with a streamlined IT acquisition process from submission to delivery and serve as a central repository for the CIO/G6 to track requests, manage digital signatures, conduct analysis on purchasing trends, establish thresholds and projections, automate financial reporting, and provide decision makers with relevant metrics in real time. By building these tools into the Army financial platforms and working back towards the IT needs of the Warfighter, the Army can realize a sustainable solution for efficient, accountable, and visible IT procurement .

Disclaimer

The views expressed in this paper are those of the authors and do not reflect the official policy or position of the United States Army, the United States Air Force, the Department of Defense, or the U.S. Government.

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Acronym QuickScan

- AHP – Analytical Hierarchy Process
- APE – Army Program Element
- APMS – Army Portfolio Management Solution
- ARPL – Army Resource Priority List
- ARFIT – Army Request for Information Technology
- CIO – Chief Information Officer
- CHESS - Computer Hardware Enterprise Software and Solutions
- CMMI – Capability Maturity Model Integration
- COTS – Commercial Off The Shelf

DISA – Defense Information Systems Agency
GFEBS - General Fund Enterprise Business System
GO – General Officer
DIACAP - DoD Information Assurance Certification and Accreditation Process
ELA – Enterprise License Agreement
EPV - Electronic Procurement Vehicle
ESA – Enterprise Service Agreement
FY – Fiscal Year
FIFO – First In First Out
IA – Information Assurance
IT – Information Technology
JCA – Joint Capability Area
MDEP – Management Decision Packages
NAV-IDAS – Navy Information Dominance Approval System
OMB – Office of Management and Budget

VI. Prioritization System

Chapter Overview

The existing Goal 1 Waiver system creates time waste for the CIO/G6 and the requesting unit. In the existing First-In-First-Out waiver process requesting units rarely see their time critical requests addressed before the equipment is needed. As a result, units began calling the Goal 1 Waiver management team directly to approve their critical needs. The team members did not have the authority to approve waivers out of sequence based on the comments of a General Officer GO not in their chain of command. Unit commanders began calling the Army CIO directly to make a prioritization decision. If the request was valid, the CIO would call the Goal 1 Waiver team to authorize the processing of the waiver in question. This waste of senior leader time is now an unofficial part of the requisition process, and fosters a culture in which the most adamant complainers have their needs met first.

The CIO/G6 believes their inability to prioritize requests with the existing system requires the most immediate attention, and seeks to answer the question: “How can we address the most important requests first while remaining equitable to the community as a whole?”

Value Focused Thinking will be utilized to achieve a state in which requests stack themselves according to total Army importance and develop a system that applies CIO/G6 determined value to fixed inputs from the user. The additive values of these inputs will determine the relative value of the request and automatically sort all requests from most urgent to least. In order to accomplish this, the CIO/G6 must determine relevant categories, subcategories, and appropriate weighting for each.

Categorizing

Relevant criteria for standardizing request importance comes from two general sources: Army guidance in the form of doctrine and policy, and criteria relevant to the execution of Army IT procurement.

Existing Army doctrine and policy provides appropriate and applicable guidance to IT procurement in four categories. As stated in the paper, the four categories of Army equipping and resource guidance applicable to this system are: Army Mission Support, Unit Mission Criticality, Asset Replaceability, and Total Cost of Ownership.

The first two categories, and their defined subcategories, are directly applicable to this system without changes. The Asset Replaceability timelines should be reviewed in conjunction with Service Level Requirements, and Total Cost of Ownership price breaks should be evaluated for accuracy following the first year of implementation due to the potentially arbitrary nature of the stated price points.

Army Mission Support (G3/5/7). This category is essential to accurate prioritization and should be weighed heavily. The four Army Resource Priority List (ARPL) sub-categories are defined in AR 525-29 as follows:

Table 2. Army Mission Support Sub-categories

Army Mission Support	
Capability	Description
Expeditionary	Includes deployed or employed forces and critical institutional requirements.
Critical	Includes next to deploy or employ forces.
Essential	Includes remaining institutional requirements.
Enhancing	Includes transformation or resetting forces.

Unit Mission Criticality (DA PAM 190-51). The Army G8 equipping guidance (Army G8, 2013) and the annual unit IT transformation plan (IAW AR 25-1, 2013) will drive unit purchasing priorities to meet strategic and mission goals. These guidelines primarily shape unit level focus, and can be easily categorized in accordance with the Risk Analysis for Army Property (DA PAM 190-51, 1991) evaluation factors for loss. However, instead of loss, the unit will categorize purchases as: Essential, Critical, Significant, Moderate, and Minor to evaluate the risks of non-acquisition. *Note: Army definition of Critical and Essential is not consistent between documents. Stakeholder consensus must align definitions when creating the Unified Taxonomy.*

Table 3. Unit Mission Criticality Sub-categories

Unit Mission Criticality	
Purchase	Description
Essential	User could not carry out mission without asset
Critical	Non-acquisition would have serious impact on user mission
Significant	Non-acquisition would have a significant impact on user mission
Moderate	Non-acquisition would have moderate impact on user mission
Minor	Non-acquisition would have minor impact on user mission

This category provides the requestor with the potential for unmitigated abuse of a weighting system and should not be weighted as heavily as a category that is not subject to interpretation.

Asset Replaceability (DA PAM 190-51). Time required to replace an asset is a strong metric for analysis when evaluating services that are considered “Always on.” DA PAM 190-51 uses cut offs of 5, 30, 90, and 180 days, but those time periods could provide more accurate value if adjusted to meet Service Level Requirements for the broad spectrum of services that could include anything from a switch replacement, to cable installation, to contracted portal access.

Table 4. Asset Replaceability Sub-categories

Asset Replaceability	
Days	Description
5	Mission can tolerate asset replacement in up to 5 days
30	Mission can tolerate asset replacement in up to 30 days
90	Mission can tolerate asset replacement in up to 90 days
180	Mission can tolerate asset replacement in up to 180 days

Total Cost of Ownership (DA PAM 190-51). Purchase price, lifetime operating and maintenance, and disposal all factor into this value. Current price breaks of \$25,000, \$100,000, \$250,000, \$500,000 and \$1 million appear to be arbitrary round values, but do serve as valuable divisions when evaluated against requestor budgets.

Table 5. Total Cost of Ownership Sub-categories

Total Cost of Ownership	
Cost	Description
\$25,000	Lifetime cost of ownership exceeds \$25,000
\$100,000	Lifetime cost of ownership exceeds \$100,000
\$250,000	Lifetime cost of ownership exceeds \$250,000
\$500,000	Lifetime cost of ownership exceeds \$500,000
\$1,000,000	Lifetime cost of ownership exceeds \$1,000,000

Once the Army's intent is accounted for, the Goal 1 Waiver database and those who perform daily operations will determine the remaining system relevant categorization criteria.

System State. This category is included due to the emphasis on IT disposition in CIO/G6 transformation documents. The six categories: New Acquisition, Life Cycle Replacement, IT Support, Upgrade, Maintenance, and Moratorium are chosen based on analysis of the 2013 Goal 1 Waiver submissions.

Table 6. System State Sub-categories

System State	
State	Description
New Acquisition	Acquisition meets a new mission requirement
Life Cycle Replacement	Replaces existing requirement at end of life
IT Support	Technical support for existing system
Upgrade	Technical update or improvement to existing system
Maintenance	Routine or contingency support for existing system
Moratorium	Required exception to existing freeze on specified purchase

O&M. Operation and Maintenance is currently a highly influential category as the Army seeks to offload ownership of IT resources to service contracted external entities. Therefore, at this time Outsourced requirements would have a higher weight than Army Maintained requirements.

Table 7. Operation and Maintenance Sub-categories

Operation and Maintenance	
Ownership	Description
Outsourced	Services contracted to an external organization.
Army Maintained	Owned, operated, and maintained by Army assets.

Time Sensitivity. This category is a rolling down calculation based on the number of days remaining until the user stated need date: 180+ days, 180 days, 90 days, 60 days, 30 days, 15 days. It is necessary to account for mission requirements, but giving a requestor the ability to attribute urgency to the purchase carries a high potential for abuse. This abuse potential is mitigated by the Time in Queue category.

Table 8. Time Sensitivity Sub-categories

Time Sensitivity	
Days	Description
180+	Mission requires the asset in more than 180 days
> 180	Mission requires the asset in no more than 180 days
> 90	Mission requires the asset in no more than 90 days
> 60	Mission requires the asset in no more than 60 days
> 30	Mission requires the asset in no more than 30 days
> 15	Mission requires the asset in no more than 15 days

Time in Queue. This category is a rolling up calculation based on how many days have elapsed since the request was entered into the system: 15 days, 30 days, 60 days, 90 days, 180 days, 180+ days. The fields and weights of this category will be in direct opposition to those of time sensitivity. This is done for two reasons. First, the system will reward units that plan in advance with a heavy double weighting when the potentially low priority purchase they planned for at the beginning of the year approaches its need date. Second, this field will act as a priority counter weight for units that seek to abuse last minute purchasing. Valid last minute needs will reflect their high value through the aggregate of other high value fields and if necessary, with the Commander's flag endorsement which will send the request to the top of the queue.

Table 9. Time in Queue Sub-categories

Time in Queue	
Days	Description
> 15	Official request submitted less than 15 days ago
> 30	Official request submitted less than 30 days ago
> 60	Official request submitted less than 60 days ago
> 90	Official request submitted less than 90 days ago
> 180	Official request submitted less than 180 days ago
180+	Official request submitted greater than 180 days ago

Scope. This category is included as an internal observation of the CIO/G6 to address the breadth of Soldiers and civilians impacted by the purchase or lack thereof. The subcategories include: Single Organization, Multi Command, Multi Installation, Army Wide, Joint, or Multinational.

Table 10. Scope Sub-categories

Scope	
Impact	Description
Single Organization	This request benefits the requesting organization
Multi Command	This request provides benefit to multiple organizations on the installation
Multi Installation	This request provides benefit across installations
Army Wide	This request provides benefits across the US Army
Joint	This request provides benefits to other armed services
Multinational	This request provides benefits to foreign military entities

Command. The CIO/G6 would weight commands based on their experience with managing IT procurement requests, and senior leader guidance. This weighting serves much like Scope, in that the greater area of influence will be take into account, but should not be weighted so heavily that it becomes insurmountable to single unit mission critical purchases.

Commander's Flag. The Commander's Flag is meant to invert the current process of GOs directly contacting the CIO when they have mission critical purchase requests. This category will apply an additive value great enough to exceed all other requests that have not been flagged. This value will be the same for each command, allowing the flagged requests to remain in value sequence at the top of the queue. It will be the responsibility of the Goal 1 Waiver staff to identify abuse of this category, and allow the CIO to determine abuse, warn, and ultimately remove this capability from offending units.

Excluded Categories of Note.

The Army GFEBS Commitment Item (CI) criteria are the data element that defines the initial use of executed funds. These derive from the Office of Management and Budget (OMB) Object Class. This field did not make the cut for Request Package prioritization due to its IT Asset focus, but would be an element to consider for IT Asset categorization criteria.

Higher Command level priority sorting also failed to make the list. By utilizing a Rank Order Centroid (ROC) weighting system that provides distributive weights to all elements in an ordered list, Higher Commands would have the ability to sort their priorities. This category was rejected because it would require considerable maintenance on the part of the command, and enable a high potential for abuse.

Weighting

The weighting system is intended to shape the behavior of the end users to support robust decision making processes by the waiver evaluation team. Weights should reward units for annual planning and budgeting within the Army prescribed window, and penalize urgent submissions with the caveat that the Commanding GO has the ability to override this penalty. The specific categories and fields within each category must be relevant to the system, and structured in such a way as to provide the Army CIO an exhaustive mechanism for managing waiver priorities through the manipulation of weights.

A two tier Value Focused Thinking evaluation criteria lends itself to this weighting system due to the single field decision nature of these dissimilar criteria. The Request Value will be determined as follows:

Categories. The categories listed in the previous section will serve as the 11 input fields. The first 10 will be considered the base required fills, while the Commander's Flag will be included separately as a special condition (Figure 2).

Army Mission Support	Unit Mission Criticality	Asset Replaceability	Total Cost of Ownership	System State	O&M	Time Sensitivity	Time in Queue	Scope	Command	Commander's Flag
W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9	W_{10}	10

Figure 2. Categories

For formula evaluation purposes a specific category is identified using index i . The CIO/G6 will evaluate the 10 categories and assign each category a weight (W_i) in a way such that the sum of the 10 category weights always equals 10 (Equation 1). The Commander's Flag category will have a fixed independent weight of 10.

Equation 1. Category weighting summation

$$\sum_{i=1}^{10} W_i = 10$$

Selections. Within each category there will be a variable number of selections (n_i) which address the needs of the category. Users will select only one value (i_j) within each category (Figure 3).

Army Mission Support		Unit Mission Criticality	
W_1		W_2	
s_{11}	Expeditionary	s_{21}	Critical
s_{12}	Critical	s_{22}	Essential
s_{13}	Essential	s_{23}	Significant
s_{14}	Enhancing	s_{24}	Moderate
		s_{25}	Minor

Figure 3. Selection notation

The CIO/G6 will evaluate and score each selection criteria (S_{ij}) within the category such that the sum of these selections will always equal 10 (Equation 2). The chosen selection will be used in the Request Value Formula.

Equation 2. Selection scoring summation

$$\sum_1^n S_{ij} = 10$$

Request Value. The total request value for the Request Package will be determined by the sum of each category weight multiplied by its selection score (Figure 4). The Commander's Flag will add a fixed value of 100 or 0, depending on the selection (Equation 3). This will guarantee flagged requests move to the top of the queue but remain in their true value order sequence.

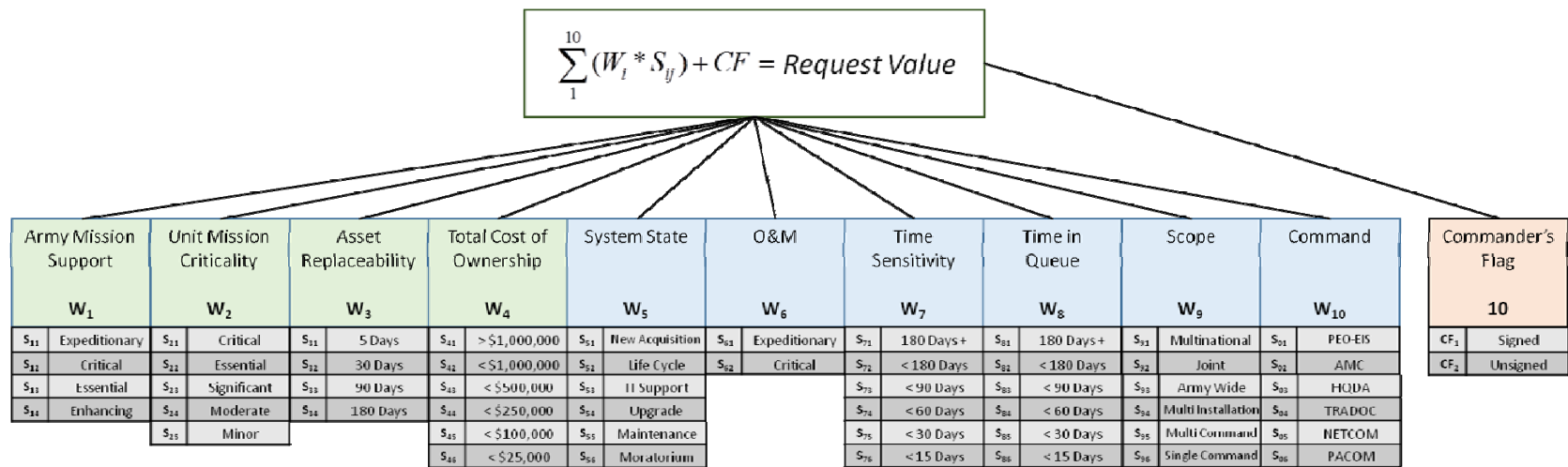
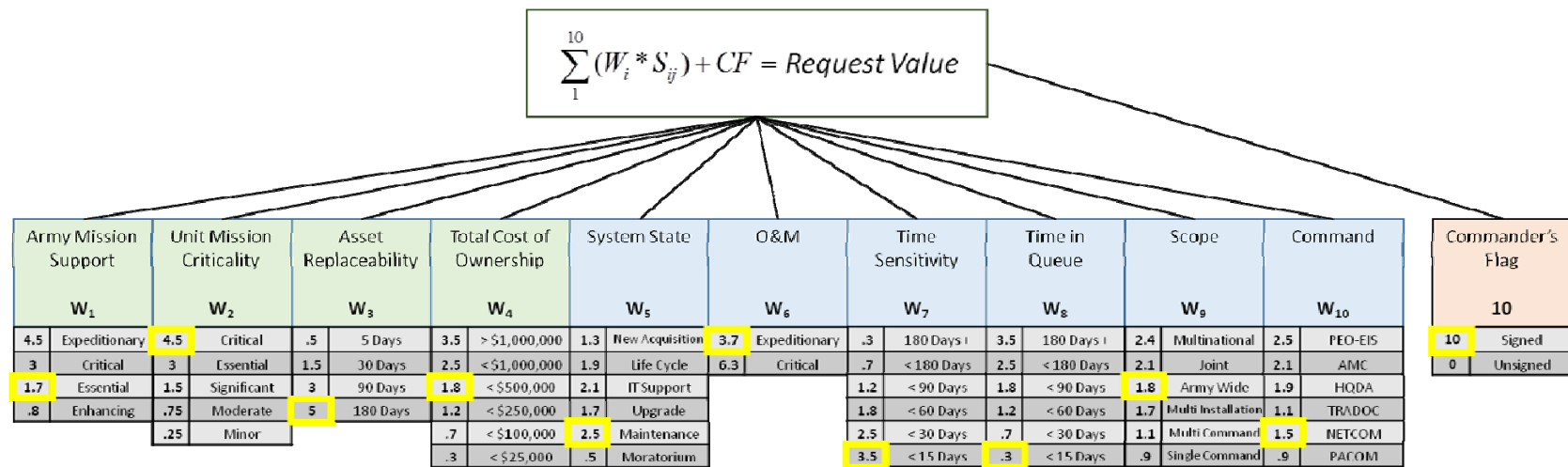


Figure 4. Request Value Notation Chart

Equation 3. Request Value Formula

$$\sum_{i=1}^{10} (W_i * S_{ij}) + CF = Request Value$$

Figure 5 depicts an example weighting scheme by which the hypothetical requests in Figure 6 are generated. The Goal 1 Waiver team would then process the orders in Table 11 from first to last, ignoring the package number. The CIO/G6 would be responsible for conducting analysis of the weighting system and determining if the level of importance is being sorted correctly, and what modifications should be made in order to improve prioritization accuracy.



$$\begin{aligned}
 \text{Request Value} &= (W_1 * S_{13} + W_2 * S_{21} + W_3 * S_{34} + W_4 * S_{43} + W_5 * S_{55} + W_6 * S_{61} + W_7 * S_{76} + W_8 * S_{86} + W_9 * S_{93} + W_{10} * S_{05}) + CF \\
 &= (1.4 * 1.7 + .7 * 4.5 + .9 * 5 + 1.2 * 1.8 + 1.1 * 2.5 + 1.1 * 3.7 + .6 * 3.5 + .8 * .3 + 1 * 1.8 + 1.2 * 1.5) + 10 * 10 \\
 &= 124.95
 \end{aligned}$$

Figure 5. Request Value Calculation Example

Table 11. Example Waiver Priority Order

Example Waiver Priority		
BN A/BDE 3	Package 13	129.78
BN D/BDE 6	Package 16	124.95
BN C/BDE 3	Package 3	29.01
BN F/BDE 7	Package 12	26.6
BN C/BDE 5	Package 15	26.07
BN D/BDE 4	Package 4	25.64
BN F/BDE 8	Package 18	25.25
BN B/BDE 4	Package 14	23.44
BN E/BDE 7	Package 17	23.76
BN D/BDE 5	Package 10	24.9
BN C/BDE 4	Package 9	23.66
BN A/BDE 2	Package 7	23.7
BN B/BDE 2	Package 2	23.41
BN E/BDE 5	Package 5	21.88
BN F/BDE 6	Package 6	23.3
BN A/BDE 1	Package 1	19.93
BN B/BDE 3	Package 8	21.37
BN E/BDE 6	Package 11	19.4

Summary

This prioritization system would provide all stakeholders with immediate benefit towards meeting their mission goals with the CIO/G6 establishing even ‘best guess’ weights and scores. The CIO/G6 would refine these values annually to enhance the effectiveness of the system, and monitor for abuse and anomalies. These recommendations are made from an outside perspective, and may need to be modified to meet the actual operating environment.

VII. Automated Architecture

Chapter Overview

Army IT procurement is currently a cumbersome process. Requestors are required to manually gain approval from unrelated organizations with unique submission requirements, authorization criteria, and limited tracking tools. These interactions are time consuming, inefficient, and often frustrating exchanges that have the potential to provide the Army with considerable efficiency gains if reformed correctly.

By replacing the existing process with a highly automated collaboration dashboard, Army units could coordinate with all interested stakeholders through a single submission mechanism. The dashboard would provide real time tracking updates to all stakeholders of a given Request Package, to include individual IT Asset progress through the system. When a stakeholder completes the designated task, the dashboard would automatically route the request to the next stakeholder and generate an email notification for action. Units would be able to track who currently owns the action and for how long, what actions stakeholders have taken, and their comments in a format that would remove all ambiguity and could be briefed directly from the interface without transcription. Finally, stakeholders would be allowed custom interface options that would allow them to display and arrange request data in a way that best suits the needs of their organization. The formatting changes become transparent and adjacent entities, such as the DoD CIO would be able to query and review a request without the Army investing man hours in document conversion.

Organizational Considerations

A primary consideration when looking to improve a business process is the applicability of Reengineering vs Lean principles. The scope and authority of this research does not reach far enough into the organizational infrastructure of the US Army to allow for large scale reengineering, and must focus primarily on Lean principles.

The one area in which this research does propose reengineering is the establishment of the Army Service Broker. Consolidation of management for existing contracts and the negotiation of new ones can yield multiplicative gains for the Army when seeking to reduce waste through redundancy, and gain efficiencies through optimal management structures. This concept is currently in development in other sections of the CIO/G6.

Technical Foundations

Application of Lean principles in this environment begins by planning the IT procurement architecture with adjacent organizations in mind. Building a software independent architecture into the existing financial backbone, who has a vested interest in IT procurement, will reduce waste, prevent duplication of data, and enable centralized data control. This integration can also reduce potentially high initial development costs, enable long term savings, unify organizations goals, information management clarity, and reduced maintenance.

This consolidation will require stakeholders to establish a Unified Taxonomy. Terminology consensus will decrease processing time between organizations, amplify the value of database entries, and ultimately set the stage for long term integration of

systems. At the enterprise tier, Army IT procurement should subjugate its language to the Unified Taxonomy standard where possible. Unified Taxonomy and Entity norming within the database is critical to establishing long term usability of data as information for all Army financial systems.

Application Interface

The existing CIO/G6 IT procurement work flow is highly optimized for the existing organizational framework. This research does not seek to reengineer procurement relationships, as that is beyond the scope and authority of this research. Instead, Lean principles are realized through automating the existing manual work flow architecture.

Automation can provide many benefits to stakeholders. Automated processing can provide custom views to each type of user, eliminating the need for format management throughout the process. All requests can be tracked in real time, depicting who owns the current action and for how long. Rules for automated email notification can be established. The interface can serve as a central repository for signature authority and alleviate traditional version control issues. Finally, a consolidated automation system allows for the most comprehensive metrics of the IT procurement process and will yield accurate and valuable analytics on the health and trends of the entire IT procurement process.

The proposed automated system architecture is flexible and highly adaptable, constructed in such a way as to support any changes to policy, organizational constructs, or work flow processes. The DoD Joint Capability Areas (JCAs) are the cornerstone for

depicting the capability enabled by this architecture, and the capabilities leveraged to accomplish the mission. The proposed architecture also details activity definitions, measures of performance and efficiency, and system functionality in the CONOPS included as Appendix A.

Software Platform

Army procurement needs must be considered when choosing a software platform to implement the proposed architecture. This does not mean the Army cannot use the same model as an adjacent organization, but the needs of the Army process needs to be the first consideration.

The Navy's organizational needs and procurement processes are more similar to the Army than any other organization available to this research. As such, the Navy's procurement platform, Navy Information Dominance Approval System (NAV-IDAS), would be a relevant model to pattern the Army's solution after while accounting for our unique requirements. The dashboard would build on the tools developed to mitigate the short term acquisition challenges outlined above. The most cost effective and software efficient solution would be to contract with an organization that has experience with this specific need and to build the dashboard into an existing Army funded platform. Contrary to the implementation of NAV-IDAS, the Army IT Acquisition platform would be build on the existing financial processes from the beginning to maximize system efficiency, and mitigate any potential integration issues in the future.

Analysis and Reporting

The Army gains benefit from this architecture when value added analysis is provided to decision makers. By the time this architecture is operational, analysis should be the primary role of the CIO/G6, and reporting must be integrated into the underlying automation of the architecture for stakeholders (GFEBS, APMS) and serve as the standard process for CIO/G6 reports to higher. The details of analysis and reporting are beyond the scope of this research due to the need for final stakeholder input. Instead, this architecture stages procurement data in such a way as to be consolidated into functional information and actionable knowledge.

Summary

The proposed automated architecture serves as a consolidated effort to apply all Lean principles identified as valuable to the Army IT procurement process. By streamlining the notification, tracking, signing, and reporting of IT procurement elements, the Army can gain significant operational efficiencies while establishing a foundation for long term consolidation and integration.

VIII. Conclusions and Recommendations

Chapter Overview

This research sought to address the question, “How can the Army improve visibility and accountability in the way it processes, manages, and reports Information Technology procurement?” through understanding of the existing Army IT procurement process, the challenges that exist in that process, an investigation into how the process can be more responsive to the Warfighter while providing senior leadership with decision quality information, and developing a road map to improve the process based on these findings.

Conclusions of Research

RQ1: What is the existing Army IT procurement process? The Army CIO/G6 literature on the Army Request for Information Technology process and the CIO/G6 procurement staff served as the foundation for understanding the philosophy behind the process. Hands on research within the Goal 1 Waiver system provided the insight into how daily tasks are executed.

RQ2: What challenges have stakeholders identified with the existing IT procurement process? The existing system lacks purchase visibility and accountability at the senior leader level. Army budgeting and finance systems have no automated reporting interface through the procurement process. Army requestors are frustrated with the inefficiency of the system and the time delay between request and fielding.

RQ3: How can we be more responsive to Warfighter IT needs? By first prioritizing requests based on mission and guidance criticality the Warfighter can

expedite fielding of mission essential equipment. A consolidated automation dashboard will provide long term sustainability to the Warfighter for planning, tracking, and record keeping.

RQ4: Can we improve the process for handling unprogrammed requests?

By creating a unified taxonomy among stakeholders and using the terminology as the foundation for a consolidated procurement process, the CIO/G6 will be able to conduct value added analysis on unprogrammed requests to identify trends and opportunities for reintegration into contracted and automated purchase venues.

RQ5: How can we integrate budgeting projections and financial reporting into a single unified process? A consolidated automation dashboard founded on a unified taxonomy will offer a platform by which APMS can inject information, and GFEBS can pull information, thus bridging the existing gap between the two systems

RQ6: How can we provide senior leadership with decision quality information? The consolidated automation dashboard can draw on the standardized database to construct customized analysis on all requests and articulate the true IT procurement needs of the Army as a whole.

RQ7: What next generation system architecture could improve the Army IT procurement process?

The next generation system architecture for IT procurement integrates easily with adjacent organizations, tracks all request information from initiation to fielding, automatically manages request ownership and digital signatures, and allows administrators the flexibility to adapt the system to evolving Army requirements.

In the process of addressing the stated research questions this research proposed a solution that remains relevant when faced with changes to work flow, or migration across software platforms; and recommended short term actions that support long term integration and sustainability. The recommendations provided do not inherently carry fiscal resource burdens, only man hours from IT procurement stakeholders and moderate to low levels of technical expertise.

Significance of Research

This research seeks to use resources more efficiently to provide better IT procurement service to the Warfighter while reducing costs for the US Army by facilitating long term integration between Army financial systems and the elements responsible for executing funds.

Recommendations for Action

The US Army should consider this research when seeking to establish guidelines for a durable and relevant IT procurement Architecture. The proposed actions can only be successful if the Army CIO/G6 and all interested stakeholders provide input to establish a unified taxonomy, and prioritization weight values that support the priorities of Army leadership.

Recommendations for Future Research

This research sets the guidelines for construction of the procurement architecture. Once stakeholders have established a unified taxonomy and prioritization values,

Database alignment is the first step towards establishing an analysis and reporting system. The specific construction of analysis and reporting tools will be critical to the long term evolution of this IT procurement architecture.

Summary

This research examined the IT Acquisitions challenges facing the Army brought on by a decade of war and proposed a possible course of action for short term and longterm changes through prioritization and a Unified IT Acquisition Taxonomy. This course of action would lay a foundation for the Goal 1 Waiver system to migrate into an automated collaborative dashboard. This dashboard would provide the Army Warfighter with a streamlined IT acquisition process from submission to delivery. Beneath the dashboard, the central repository would allow the CIO/G6 to track requests, manage digital signatures, conduct analysis on purchasing trends, establish thresholds and projections, automate financial reporting, and provide decision makers with relevant metrics in real time. By building these tools into the Army financial platforms and working back towards the IT needs of the Warfighter, the Army can realize a sustainable solution for efficient, accountable, and visible IT procurement.

Appendix A

Army Information Technology Acquisition System (ITAS)



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PROJECT PROPOSAL

Problem Statement

In order to ensure Information Technology (IT), Information Assurance (IA), and streamline IT Acquisitions to the Army Warfighter, the Army created a bulk purchasing program comprised of Enterprise Procurement Vehicles (EPV). These programs contract bulk purchases of IT Assets that can then be purchased by US Army Command units. If the Warfighter requires an IT Asset that is not part of an Enterprise Procurement Vehicle, they file a waiver with a separate system called Goal 1 Waiver. This process is a manual process staffed by just three people verifying the requests meet funding and IA requirements. Non-contracted IT requests have risen dramatically. In 2013 these non-contracted IT requests totaled \$1.6 billion¹. Of these non-standard requests, \$1.1 billion were unable to provide taxonomy, trends, or procurement projections due to the ambiguity of the user interface and manual process of verification². As of March 2014, the calendar year 2014 total has already surpassed \$1.5 billion³. Additionally, the limited manpower of the Chief Information Officer (CIO)/G6, lack of integration with Army General Fund Enterprise Business Systems (GFEBS) and Army Portfolio Management System (APMS) extends the initial validation process beyond ten days, given there are no errors or ambiguities in the request. If there are errors, the process could extend over a month of reprocessing. The processing time if there are errors is unacceptable to both the Warfighter and the Army CIO/G6. The growing need for non-contracted IT Assets and lack of asset request visibility for new contracts creates an environment where EPVs are critically underutilized and is fiscally irresponsible. A system is required to create one system to supply IT Assets to the warfighter and provide visibility for decision makers to identify assets for reprogramming.

Architectural Goal

The goal of this architecture effort is to create a system that supplies IT Assets to the warfighter that meet the stringent Information Assurance requirements of the Department of Defense (DoD). Additionally, the architecture will provide a method for providing visibility to the decision makers to identify assets for reprogramming by identifying and reporting essential data.

¹ Goal 1 Waiver Report, 2013

² Goal 1 Waiver Report, 2013

³ Goal 1 Waiver Report, March 2014

This effort will be accomplished by examining the current relationships in the Army procurement process and identifying where capabilities can be filled by existing systems and what capabilities are needed by ITAS

Scope

This project looks to establish an architecture to develop a new IT Acquisition system that interfaces with existing Army systems including EPVs, GFEBS, and APMS in order to simplify the supply process. This system will replace a current process that manually verifies non-standard waiver requests. Additionally, it will add additional capabilities of providing a categorical taxonomy for IT requests that will drive reports to decision makers, prioritizing IT requests at the Command level, verify IA standards and validate funding.

This project looks to establish the taxonomy and prioritization criteria within the next six to twelve months and an interface evolution within the next eighteen months.

Integration of adjacent systems should begin in the next two years with full integration in three to five years

Context

Driving Documentation:

- Army Regulation 25-1: Army Information Technology
- Army Regulation 70-1: Army Acquisition Policy
- Memorandum: Department of the Army (DA) Information Technology (IT) Acquisition and Procurement Policy
- Memorandum: Army Waiver Process for Commercial-Off-the-Shelf Information Technology (COTS IT) Procurement Outside the Computer Hardware, Enterprise Software and Solutions Program

Memorandum: Support to the Army Request for Information Technology (ARFIT)

Process

Driving Organizations:

- US Army CIO/G6
- US Army Cyber Command

Impacted Organizations:

US Army Major Commands, Army Service Component Commands, and Direct Reporting Units submit IT Requests. This system will impact every organization in the US Army.

Critical Questions

1. How do similar organizations address nonstandard IT procurement?
2. What commercial best practices are applicable?
3. What IT taxonomy structure is appropriate for the Army?
4. What information do decision makers need?
5. What decision makers need the information?
6. What format is easiest for the user to provide accurate information?
7. How do EPVS, APMS, and GFEBS organizational structure impact their role?

8. What interfaces currently exist for EPVS, APMS, and GFEBS?
9. Could the taxonomy change in the future? If so, who needs access to make the changes?
10. What financial impact will this new system have? What is the cost to acquire and maintain? What cost savings will the US Army experience from streamlining the system and reprogramming IT Acquisitions?
11. What security requirements are dictated for IA systems?

CONOPS

Section I - Issue

A. Problem Statement

The integration of Information Technology is critical to the current and future success of the modern American war fighter. As potentially the largest single consumer of IT equipment in the world, the United States Army must be able to address the exponentially growing demand to supply IT at all echelons. As of March 2014, Army non-standard IT requests have exceeded \$1.5 billion for the year 2014⁴. Only a small fraction of these expenditures can be categorized. This means that there is no visibility into the type and specifications of the IT equipment acquired. EPVs function as the primary source for consolidated and programmed purchasing, while the Goal 1 Waiver process is designated to handle all other non-standard procurements. In its current state, the Goal 1 Waiver process is a manual approval process that provides no mechanism to perform analysis on the IT assets being processed. The current system does not allow any insight in to what assets could be reprogrammed back into the EPVs process for bulk purchases. Over time, this has created an underutilization of the EPV process. This lack of visibility inhibits decision makers from effectively supplying the warfighter. The current waiver system works in a first-in, first-out method for processing requests. This does not allow the Commands to prioritize their requests.

B. Purpose of the Concept Of Operations (CONOPS)

In order to maintain a well-equipped force in a cost effective manner, the Army needs to supply IT assets to the warfighter that meets all IA requirements, whether in a programmed EPV or non-standard procurement. A fundamental capability to effective warfighter supply is knowing who is buying what specific equipment, for what strategic purposes, at what priority level, and with what funds.

The Army Information Technology Acquisition System (ITAS) will provide a consolidated supply service for all information technology hardware, software, and services, regardless of procurement type or cost in order to meet the IT needs of every Army Warfighter. This service will seek to reduce overall procurement costs through the integration of funding, responsibility, authority, and accountability at all echelons while

⁴ Internal Goal 1 Waiver Report, March 2014

providing visibility of all IT procurement at the enterprise level. Accomplishing both of these endeavors ensures well-equipped Warfighters.

C. Relationship to other CONOPS and Initiatives

CONOPS Direct Support: Army Request for Information Technology (ARFIT) Initiative.

CONOPS Integration: Army Portfolio Management Solution (APMS); General Fund Enterprise Business System (GFEBS); and Army Enterprise Procurement Vehicles (EPV).

CONOPS Consideration: Capital Planning and Investment Control (CPIC) Initiative; Network Enterprise Technology Command (NETCOM) Command, Control, Communications, Computers, and Information Management (C4IM) System Architecture; Department of Defense Information Assurance Certification and Accreditation Process (DIACAP); Navy Information Dominance Approval System (NAV-IDAS).

CONOPS Compliance:

- AR 25-1 25 Jun 2013
- Army-wide Efficiencies for Computing Devices, 16 Nov 2012 (CIO/G-6)
- NexGen Wireless BPA, 17 Dec 2012 (CIO/G-6)
- DoD CIO Data Center Approvals, 9 May 2013 (NDAA 2012)
- Approvals/Waivers for Data Centers, 9 May 2013 (DoD CIO)
- Mandatory CHES Usage, 6 Jun 2013 (SecArmy)/ AFAR, Sec. 5139 (ASA(ALT))
- Data Center Budget Reporting, 12 Jun 2013 (DoD CIO)
- Waivers/Approvals for Data Centers, 14 Aug 2013 (CIO/G-6)
- Commercial Mobility Devices, 11 Sep 2013 (CIO/G-6)
- ARFIT Implementation Guidance (DRAFT) 16 Apr 2014

Section II - Overview

A. Synopsis

As a consolidated process, ITAS will enable the Army to centrally manage Army Enterprise Service acquisition and provide gatekeeper Information Assurance oversight to the Net centric War fighter.

- Categorize, request, prioritize, validate, authorize and report all IT investments for the United States Army.
- Track spending trends and project future IT acquisition requests and procurements.
- Manage unprogrammed IT expenses and redirect purchases to programmed solutions into CHES.

B. Operational View

Army Information Technology Acquisition System (OV-1)

See OV-1 in Architecture products.

C. Description of the Military Challenge

Technology, while providing the warfighter with unprecedented capabilities, also opens the door to vulnerabilities. Vulnerabilities are nothing more than enemy capabilities. If exploited these vulnerabilities can be catastrophic to the ability to protect and defend the United States. One only needs to look to the crippling effect of the Stuxnet virus on Iran's nuclear development to understand the devastating effects this type of capability can have. The only protection against enemy capabilities is strict Information Assurance. If US Army or any government agency were to purchase IT equipment from a foreign country without vetting that equipment, they could be purchasing modified equipment or software with security vulnerabilities. The State Department estimates that over \$800 million dollars of bugged equipment is installed in US corporations annually⁵. Processes that vet equipment and software purchases prevent, to the best of our ability, this type of vulnerability from happening to the US Army. In an arena where reliance on IT assets including hardware, software, wireless and data services is growing, the need to balance rapid IT procurement sometimes contrasts with strict Information Assurance. The military environment is only going to rely more on Information Technology as the future unfolds. As the need increases, so does the need to supply information technology. This is a challenge that must be met to stay above the adversary, both today and in the future.

D. Desired Effects

- Supply IT enterprise services to the Warfighter
- Manage IT procurements
- Verify and provide IT Assets that meet IA requirements

Section III – Context

A. Time Horizon

Phase I: Within 18 months establish interface capable of executing the rudimentary ITAS functions of validating and cataloging request taxonomy, tracking IT costs, and prioritizing requests.

Phase II: In 3 to 5 years achieve all desired effects of the ITAS system by total integration of adjacent systems, and total process management through the consolidated interface while adhering to all information assurance guidelines and procedures.

⁵ Defense Human Resources Activity, "Bugs and Other Eavesdropping Devices". Accessed April 2014 at <http://www.dhra.mil/perserec/osg/v3bugs/intro.htm>

B. Assumptions

- This effort is driven from the premise that contracted IT assets are cheaper to procure for the US Army than individual command purchases. This drives the desire to reprogram non-contract IT requests.
- Net-centric infrastructure is available and has the data handling capability between all systems.
- The need for IT equipment for the US Army will continue to grow. This will drive a requirement for efficient database storage and autonomous processing.
- Database storage capability already exists and has the ability to store ITAS data.
- The US Army does not want to hire more people to process IT Requests yet the current processing time is unacceptable.
- Funding is available for the entire life cycle cost of ITAS to include procurement, maintenance, and training.
- Army Units will funnel their IT requests through their Command structure. In other words, individual Army Units will not be the user requesting IT assets.
- Though a web interface, the ITAS system will be secure through CAC Access.
- The civilian workforce for the current Goal 1 Waiver system is willing and capable of managing the new ITAS system.
- Availability of EPVs, APMS, and GFEBS will not inhibit ITAS processing.
- Command level IT Requestors will be trained on the new process to establish standards and operationalize the architecture.

C. Risks

- If guidance and requirements grow from the US Army, then the scope of the project will grow which will result in poor configuration management, requirements creep, and added duration and effort on the project.
- If external systems such as EPVs, APMS, and GFEBS change, then the interfaces and data requirements for ITAS may change. This will result in changes to the architecture, rework in interface control, and could create problems with interoperability.
- If the civilian workforce is resistant to the training for the ITAS system, then adoption and proper employment of the system may be stunted.
- If training materials for Command users of the system is poor in quality, then proper categorization of IT assets may not happen. This would create reports to decision makers that do not accurately reflect the environment.

Section IV – Employment Concept

A. Critical Capabilities

JCA 4.2 Supply

JCA 4.2.1 Manage Supplies and Equipment

JCA 4.2.2 Inventory Management

JCA 4.2.4 Assess Global Requirements, Resources, Capabilities and Risks

JCA 5 Command and Control

JCA 5.1 Organize

JCA 5.1.2.3 Assign Roles and Responsibilities

JCA 5.1.3.2 Establish Collaborative Procedures

JCA 5.2 Understand

JCA 5.2.1.1 Compile Information

JCA 5.2.1.2 Distill Information

JCA 5.2.1.3 Disseminate Information

JCA 6.4 Information Assurance

JCA 6.4.1 Secure Information Exchange

JCA 6.4.1.1 Assure Access

JCA 6.4.2 Protect Data and Networks

JCA 6.4.2.1 Protect Against Network Infiltration

JCA 6.4.2.2 Protect Against Denial or Degradation of Services

JCA 9 Corporate Management and Support

JCA 9.2.1 Strategy Development

JCA 9.3 Information Management

JCA 9.4.3 Contracting

JCA 9.4.4 Portfolio Management

JCA 9.5.1 Program/Budget and Finance

JCA 9.5.2 Accounting and Finance

B. Enabling Capabilities

JCAs

JCA 6 Net Centric Capabilities:

6.2 Enterprise Services

6.3 Net Management

6.4 Information Transport

JCA 9.5.2 Accounting and Finance (through APMS)

JCA 9.4.4 Acquisition (through the EPVs and Contracting Office)

JCA 5.6.1 Assess Compliance with Guidance (through DoD CIO)

Other Enabling Capabilities

GIG: Access to the GIG for both transport and security is critical to the functionality and interoperability of the architected system.

Consolidated Data: Oracle databases will store and process data needed for successful employment of the architecture.

Training and dissemination: Dissemination and training on the new system will be critical to mission success. Training will need to be completed both at the Command level and internal actors in ITAS.

C. Sequenced Actions

Once an Army Warfighter identifies an IT need, the first step is for the warfighter to submit a request through ITAS. ITAS will immediately categorize the request. This request is then approved by their local command. It is at this level that ITAS will verify funding is allocated for the IT need through APMS. If the need is greater than \$25,000, the request must also be approved by the Army Command (ACOM) or Direct Reporting Unit (DRU). Depending on the categorization, ITAS will submit the request to the appropriate EPV to see if there is a programmed solution to the need. If the EPVs can fulfill the need, then the IT request is approved and sent to the contracting office. If the EPV cannot fill the IT request, ITAS will then prioritize the request for processing through ITAS. Commands will have access to the prioritization and will be able to change their prioritization if a need arises that has a greater urgency. For these non-standard requests, ITAS will verify all IA requirements are met through the Department of Defense Chief Information Officer (DoD CIO). Once Information Assurance has been verified, ITAS will approve the request and submit the request to the contracting office. Throughout this process, the involved actors are notified of the state of the request. ITAS will also have the capability to analyze the IT requests for trends. This information, as well as categorical breakouts of the various IT requests, are reported to both GFEBS and the CIO/G6 in order to identify assets for reprogramming into the EPVs.

D. End State

The end state of ITAS will be twofold. First, the Warfighter will have acquired their desired IT asset that adheres to DoD information assurance standards. Second, the decision makers managing the IT Acquisition process will have detailed reports that break out expenditures categorically in order to track, analyze, and project IT acquisitions, while identifying assets for reprogramming into EPVs.

E. Command Relationships

The new ITAS system is under the US Army CIO/G6 command. Inside the ITAS system, there will be an ITAS manager, who is in charge of the Database Manager and Request Manager. The ITAS Manager oversees all work flow and system health for ITAS. The Database Manager manages the data stored by ITAS and exported outside of ITAS. The Request Manager manages all internal IT Request processes and interfaces with external systems.

Originating Unit: This is the lowest level of user who interacts with ITAS. The originating unit is also the lowest level that can request enterprise services and IT equipment through ITAS. This can be any unit in the US Army.

Local Command: The command directly above the originating unit with approval authority for IT requests. The Local Command can authorize any IT request with validated funds up to \$25,000. The Local Command can also instantiate an IT Request.

Army Command (ACOM)/Direct Reporting Unit(DRU): The Army Command or Direct Reporting Unit is the command level above the Local Command. This is the approval authority for any IT Request above \$25,000. The ACOM/DRU can also instantiate an IT Request. The ACOM/DRU can also prioritize and change the prioritization of the IT requests within their command.

CIO/G6: The final authority on all IT procurements. The CIO/G6 is also in charge of all EPVs, APMS, and GFEBS.

EPVs: These encompass a collection of systems that provide programmed IT solutions. There is one for hardware and software solutions (Computer Hardware Enterprise Services and Solutions, CHESS), wireless solutions, data center requests, and others. For the scope of this project and clarity throughout the effort, this family of systems is treated as one system called the Enterprise Procurement Vehicles.

GFEBS: Supplies financial and procurement management to the US Army. All reporting is done to GFEBS so it can track IT Procurements in the total Army procurement picture.

APMS: Army Portfolio Management System interacts with ITAS by providing all funding allocations to the IT Request.

Contracting Office: The office responsible for the purchasing of IT assets once approval has been granted by ITAS.

These relationships are depicted below as well as in the OV-4 of the architecture products.

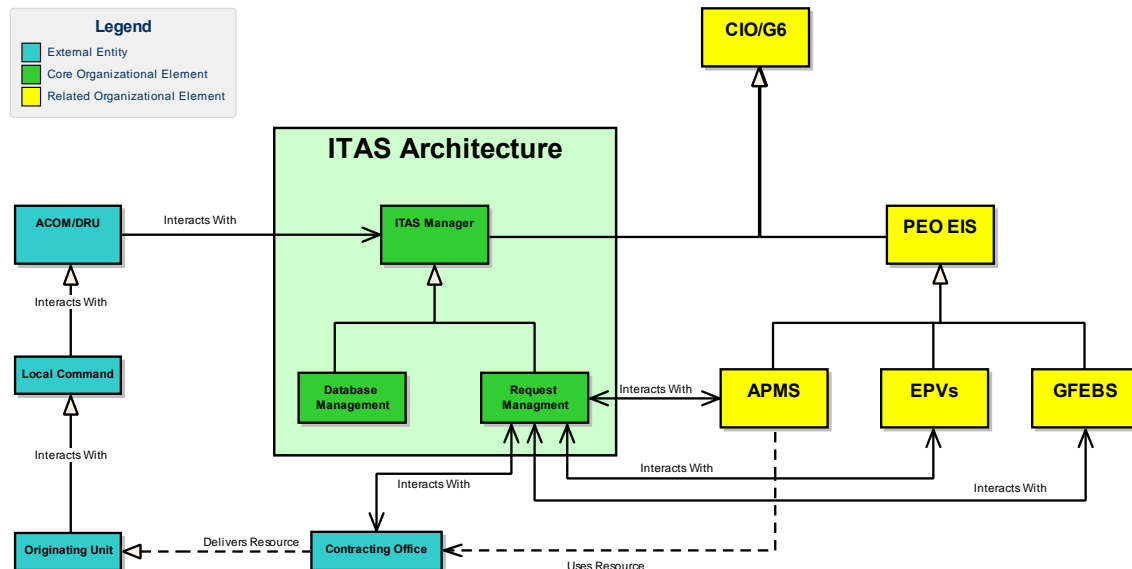


Figure 6 - OV-4 Organizational Relationships

F. Top-Level Activity Models

The following Activities are performed by ITAS:

Ensure Accountability

- Validate Requirement – Validates funding for the IT Request with APMS
- Verify Compliance – Verifies the IT Asset requested for procurement meets all IA standards
- Authorize Purchase – Approves the purchase of the IT Asset

Provide Visibility

- Categorize Needs – Categorizes IT Requests according to type, driving down to the lowest level possible in order to identify trends for the decision maker. Categorizing needs also identifies which EPV should handle the request.
- Analyze Requests – Identifies trends in the requests in order to identify IT Assets that can be reprogrammed into the EPVs.
- Report Activity – Inform decision makers of the IT request activities. This will be done categorically.

Improve Efficiency

- Track Actions – Traces the actions of the IT Request, where it is in the process, and its end state as it leaves ITAS.
- Notify Actors – Send notifications to the IT requestor, the command level, and all ITAS processors of the status of the request and work to be accomplished.
- Prioritize Requests – Eliminates the current first-in first-out processing in the waiver system by providing a weighted prioritization to IT requests. Though an initial request will be automatically prioritize in ITAS, ACOM/DRUs will have the ability to change the prioritization of requests within their command.

- Reprogram Needs –The capability for decision makers to identify IT Assets that need to be reprogrammed into the EPVs.

Section V – Summary

The United States Army requires a consolidated IT procurement process to provide the war fighter with cost effective solutions to supply their growing IT needs. The ITAS system seeks to integrate the existing elements of the procurements system to create a single IT procurement interface that will maximize the accountability and visibility of all IT expenditures, while improving process efficiency for both the end user and the Army CIO/G6. In doing so, ITAS will supply the warfighter secure and protected enterprise services and equipment through a well-managed process that enables high-visibility to decision makers.

USE CASES

Use Case Specification: PROCURE IT ASSETS

2. Procure IT Assets

2.1. This use case shows the successful path of a command requesting IT assets through receiving verified and validated IT assets. The successful path shows IT procurement through the EPVs programs since this is the preferred method of acquisition. However, the system of interest, ITAS, is extensively detailed through the alternative flow.

3. Actors involved

3.1. Primary actors: Originating Unit

3.2. Secondary actors: Local Command, ACOM/DRU, ITAS, GFEBS, APMS, DOD CIO

4. Flow of events

4.1. Originating Unit submits request for IT assets to ITAS.

4.2. ITAS validates funding allocations through APMS.

4.2.1. **Exception Flow: Funding is not allocated**

4.3. ITAS categorizes IT Request.

4.4. ITAS notifies Local Command an IT Request needs approval.

4.5. Local Command authorizes IT request in ITAS.

4.5.1. Alternate Flow: IT Request exceeds \$25,000.

4.5.1.1. ITAS notifies ACOM/DRU an IT Request needs approval.

4.5.1.2. ACOM/DRU approves IT Request.

4.6. ITAS submits IT Request to EPV for fulfillment.

4.7. EPV notifies ITAS IT Assets are programmed through EPV.

4.7.1. Alternate Flow: IT Assets are NOT programmed through EPV.

4.7.1.1. EPV notifies ITAS requested IT Assets are not programmed through EPV.

4.7.1.2. ITAS submits IT Asset Request to DoD CIO for DIACAP verification

4.7.1.3. DoD CIO returns approval to ITAS

4.7.1.3.1. **Exception Flow: DIACAP Requirements are not met.**

4.7.1.3.1.1. ITAS returns IT Asset Request to Originating Unit and ACOM/DRU.

4.7.1.4. ITAS prioritizes IT Request in processing queue.

4.7.1.5. ITAS approves IT Asset Request.

4.7.2. ITAS notifies Originating Unit and ACOM/DRU request has been approved.

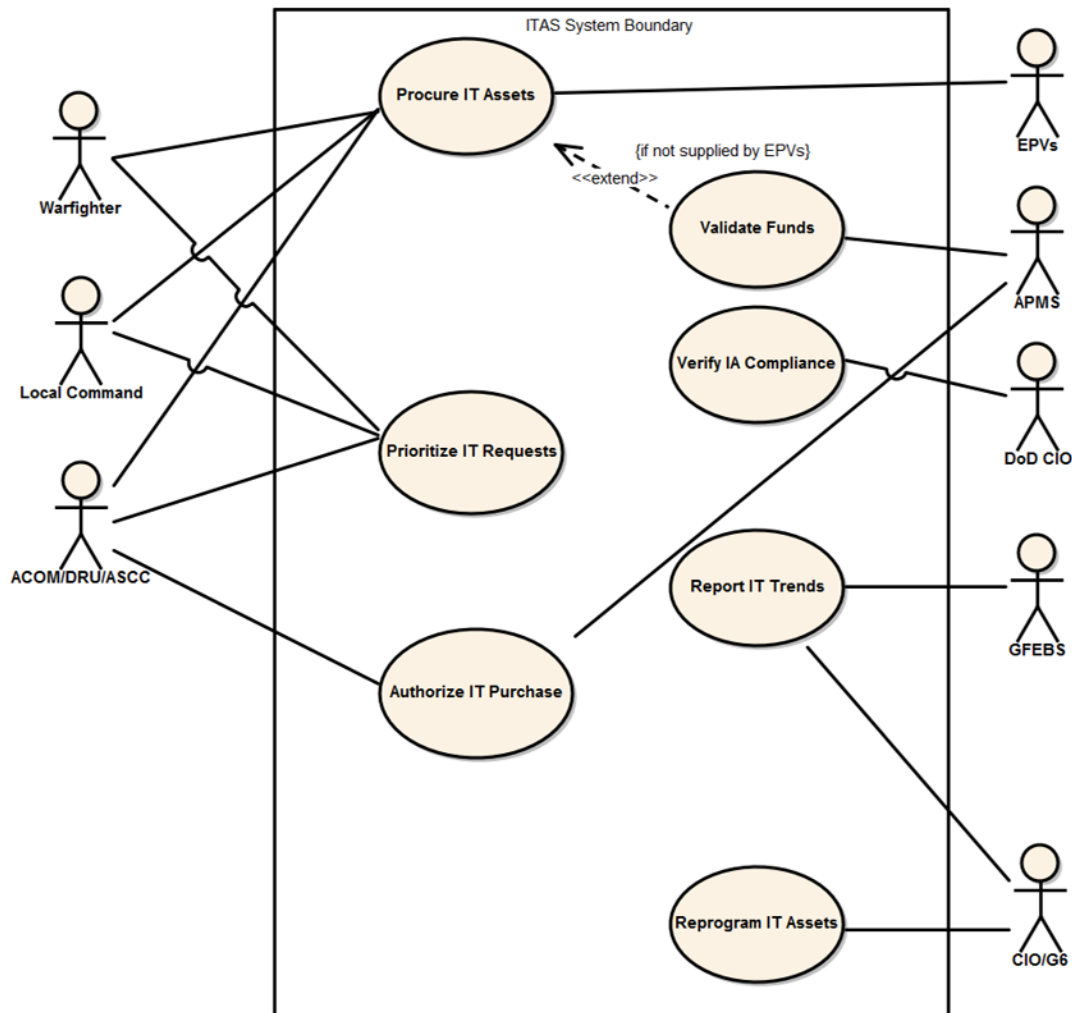
4.7.3. Originating Unit procures DoDIA certified asset(s).

4.8. EPV processes request.

4.9. EPV procures DoDCIA certified IT assets for Originating Unit.

5. Special Requirements and Assumptions
 - 5.1. IT Requests that are fulfilled by EPVs are assumed to have IA Verification
 - 5.2. If requesting Data Center Equipment, must receive DoD CIO approval per: Approvals/Waivers for Data Centers Memorandum, 9 May 2013 (DoD CIO)
 - 5.3. All IT Assets procured by the US Army must meet DIACAP Requirements.
 - 5.4. Originating Unit and ITAS are connected to the GIG
6. Preconditions
 - 6.1. User has a valid IT need
 - 6.2. User has an ITAS account.
 - 6.3. Interfaces between ITAS, EPVs, GFEBS, and APMS are available and operating nominally.
7. Postconditions
 - 7.1. User IT procurement processed for a DoDIA certified asset that meets an Army strategic End goal.
 - 7.2. IT Request has been categorized according to types of IT Assets, Funding types, and Command structure and business need.

Use Case Model



2. Figure 7 - ITAS Use Case Model

Use Case Specification: REPORT IT TRENDS

ITAS will organize and produce reports to be used by decision makers, internal ITAS management, and EPV in order to track, analyze, and project future IT Asset requests. The report must be able to capture the categorized IT Asset Requests according to Asset type as well as funding amounts, funding cites, Army command, and Army need.

Use Case Specification: REPROGRAM IT ASSETS

ITAS will submit recommendations for reprogramming IT Requests. Once a particular type of IT Asset reaches a set threshold, ITAS will notify EPV that a reprogramming recommendation is made for that IT Asset. This is done in an attempt to minimize the off-standard IT Requests and underutilization of EPV.

Use-Case Specification: VALIDATE FUNDS

APMS will validate that the inputted APMS Code is valid and money is allocated to the program.

Use-Case Specification: VERIFY IA COMPLIANCE

DoD CIO will verify the requested IT Assets are in compliance with DoD IA requirements.

Use-Case Specification: PRIORITIZE IT REQUESTS

Command sets prioritization of all submitted IT Asset Requests. ITAS processes IT Asset Requests according to the Command set prioritizations. Additionally, ITAS will have its own internal prioritization of which Command gets processed first. Command will access their prioritization of submitted IT requests and change their prioritizations as needed.

Use-Case Specification: AUTHORIZE IT PURCHASE

ITAS will authorize the purchase once funds are validated and IA compliance is validated. Once authorized, ITAS will notify the ACOM and APMS the authorization is complete.

OVERVIEW AND SUMMARY INFORMATION (AV-1)

Architecture Project Identification	
Name	Army Information Technology Acquisition System (ITAS)
Description	The goal of this architectural effort is to create an Information Technology Acquisition System (ITAS) that enables a digital procurement process for all Army IT needs. This system integrates the existing functions of EPV, APMS, and GFEBS so that decision makers can centrally monitor and manage all IT procurements, as well as identify trends and project bulk procurement needs.
Architects	Major Alexander Vukcevic
Organization	US Army CIO/G6
Assumptions & Constraints	<p>Assumptions:</p> <p>This effort is driven from the premise that contracted IT assets are cheaper to procure for the US Army than individual command purchases. This drives the desire to reprogram non-contract IT requests.</p> <p>Net-centric infrastructure is available and has the data handling capability between all systems.</p> <p>The need for IT equipment for the US Army will continue to grow. This will drive a requirement for efficient database storage and autonomous processing.</p> <p>Database storage capability already exists and has the ability to store ITAS data.</p> <p>The US Army does not want to hire more people to process IT Requests yet the current processing time is unacceptable.</p> <p>Funding is available for the entire life cycle cost of ITAS to include procurement, maintenance, and training.</p> <p>Army Units will funnel their IT requests through their Command structure. In other words, individual Army Units will not be the user requesting IT assets.</p> <p>Though a web interface, the ITAS system will be secure through CAC Access.</p> <p>The civilian workforce for the current Goal 1 Waiver system is willing and capable of managing the new ITAS system.</p>

	<p>Availability of EPVs, APMS, and GFEBS will not inhibit ITAS processing.</p> <p>Command level IT Requestors will be trained on the new process to establish standards and operationalize the architecture.</p> <p>Risks</p> <p>If guidance and requirements grow from the US Army, then the scope of the project will grow which will result in poor configuration management, requirements creep, and added duration and effort on the project.</p> <p>If external systems such as EPVs, APMS, and GFEBS change, then the interfaces and data requirements for ITAS may change. This will result in changes to the architecture, rework in interface control, and could create problems with interoperability.</p> <p>If the civilian workforce is resistant to the training for the ITAS system, then adoption and proper employment of the system may be stunted.</p> <p>If training materials for Command users of the system is poor in quality, then proper categorization of IT assets may not happen. This would create reports to decision makers that do not accurately reflect the environment.</p>
Approval Authority	
Date Completed	
Estimated Costs	

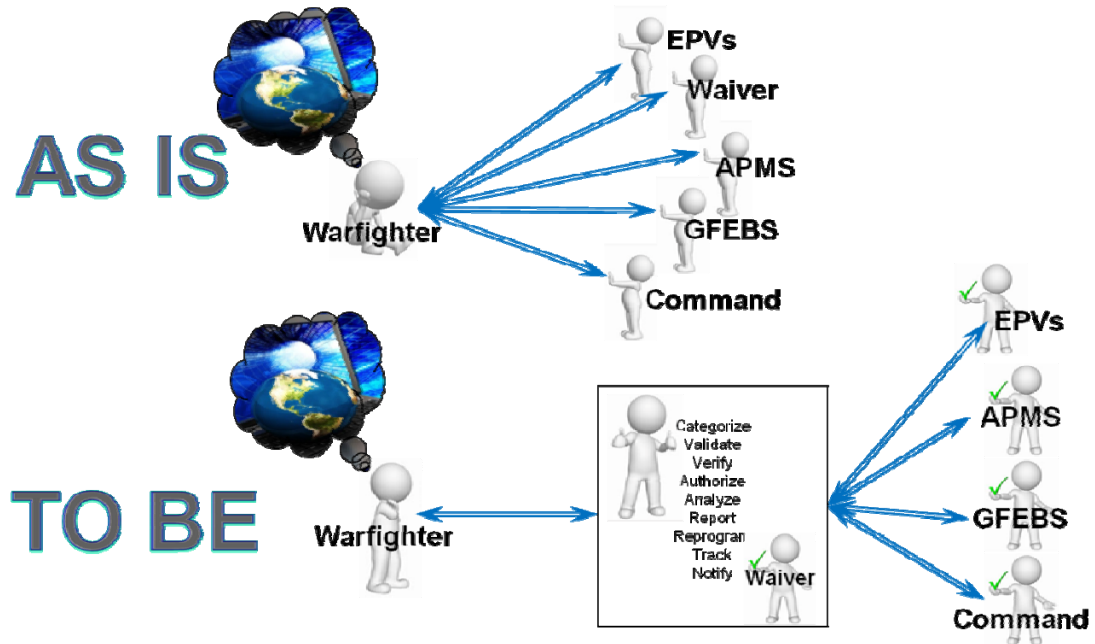
Scope: Architecture View and Models Identification	
Views Developed	Use Case AV-1 (Overview and Summary Information) AV-2 (Integrated Dictionary) CV-2 (Capability Taxonomy) CV-6 (Capability to Operational Activities) OV-1 (High Level Operational Concept Graphic) OV-2 (Operational Resource Flow Description) OV-3 (Operational Resource Flow Matrix) OV-4 (Organizational Relationships Chart) OV-5a (Operational Activity Decomposition Tree) OV-5b (Produce the Operational Activity Model) OV-6a (Rules Model) OV-6b (State Transition Description) OV-6c (Event-Trace Description) DIV-2 (Logical Data Model) SV-1 (System Interface Description) SV-4 (System Functionality Description) SV-5a (System Functionality Traceability Matrix) SV-7 (Systems Measures Matrix) SvcV-4 (Services Functionality Description)
Capabilities	Critical Capabilities JCA 4.2 Supply JCA 5 Command and Control JCA 6.4 Information Assurance JCA 9 Corporate Management and Support Enabling Capabilities JCAs JCA 6 Net Centric Capabilities: JCA 9.5.2 Accounting and Finance (through APMS) JCA 9.4.4 Acquisition (through the EPVs and Contracting Office) JCA 5.6.1 Assess Compliance with Guidance (through DoD CIO) Other Enabling Capabilities GIG Consolidated Data Training and dissemination
Time Frames Addressed	Phase I - 18 months Phase II- 3 to 5 years
Organizations Involved	US ARMY CIO/G6 US ARMY CYBER COMMAND
Purpose and Viewpoint	

<p>Purpose (Problems, Needs, Gaps)</p>	<p>The integration of Information Technology is critical to the current and future success of the modern American war fighter. As potentially the largest single consumer of IT equipment in the world, the United States Army must be able to address the exponentially growing demand to supply IT at all echelons. As of March 2014, Army non-standard IT requests have exceeded \$1.5 billion for the year 2014⁶. Only a small fraction of these expenditures can be categorized. This means that there is no visibility into the type and specifications of the IT equipment acquired. EPVs function as the primary source for consolidated and programmed purchasing, while the Goal 1 Waiver process is designated to handle all other non-standard procurements. In its current state, the Goal 1 Waiver process is a manual approval process that provides no mechanism to perform analysis on the IT assets being processed. The current system does not allow any insight in to what assets could be reprogrammed back into the EPVs process for bulk purchases. Over time, this has created an underutilization of the EPV process. This lack of visibility inhibits decision makers from effectively supplying the warfighter. The current waiver system works in a first-in, first-out method for processing requests. This does not allow the Commands to prioritize their requests.</p> <p>In order to maintain a well-equipped force in a cost effective manner, the Army needs to supply IT assets to the warfighter that meets all IA requirements, whether in a programmed EPV or non-standard procurement. A fundamental capability to effective warfighter supply is knowing who is buying what specific equipment, for what strategic purposes, at what priority level, and with what funds.</p>
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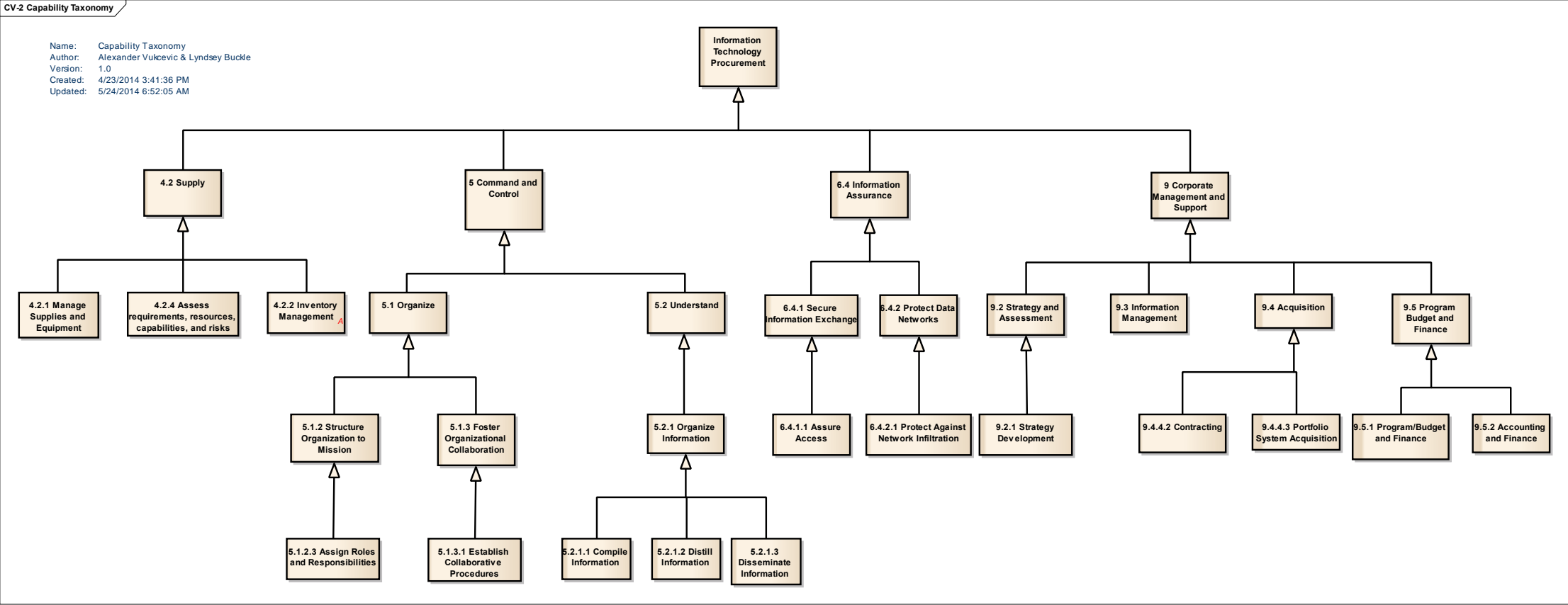
⁶ Internal Goal 1 Waiver Report, March 2014

Questions to be Answered	<ol style="list-style-type: none"> 1. How does GFEBS and APMS interface and interact with the current IT Acquisition Process? What information do these systems need from ITAS? 2. Will EPV remain its own standalone system or will it be more fully integrated into ITAS? 3. How will the process for reprogramming IT Acquisition requests that meet a certain threshold back into CHES work? Will it be automated or hand done through report outputs? 4. What data output do the decision makers need? 5. What prioritization schema will work the best and provide the most transparency to the IT Requestor? 6. Will ITAS validate then prioritize or prioritize then validate? 7. Will ITAS pull rejected IT Requests from CHES or will CHES push rejected IT Requests to ITAS? 8. How will notifications be made available to the IT Requestors? Email? Web page? 9. What information do decision makers need? 10. What decision makers need the information? 11. What taxonomy is appropriate for the US Army for IT? 12. How do the organizational structure of GFEBS, APMS, and CHES affect their role? 13. What are the current interfaces for GFEBS, APMS, and CHES?
Architecture Viewpoint	This architecture is developed with the IT Requestor in mind. The goal is to simplify and streamline the process for the IT Requester. Additionally, this architecture reaches from the decision maker perspective in order to provide additional analytics to decision makers.
Context	
Mission	“Ensure visibility and accountability of all IT expenditures throughout the Army.” – Secretary of the Army
Doctrine, Goals, Vision	Support the ARFIT goal of creating a single integrated process which requires responsibility, authority and accountability at all echelons, while giving visibility of all IT procurement at the enterprise level.
Rules, Conventions, and Criteria	The ITAS Architectural data conforms to the DoD Architecture Framework (DoDAF) Version 2.0.
Linkages to Other Architectures	ITAS is an element of the ARFIT Architecture, and linked to the CHES, APMS, and GFEBS architectures.
Tools and File Formats to be Used	
Sparx Enterprise Architect v10.0, Microsoft Word 2010, Microsoft Excel 2010, Microsoft PowerPoint 2010, Adobe Portable Document Format	

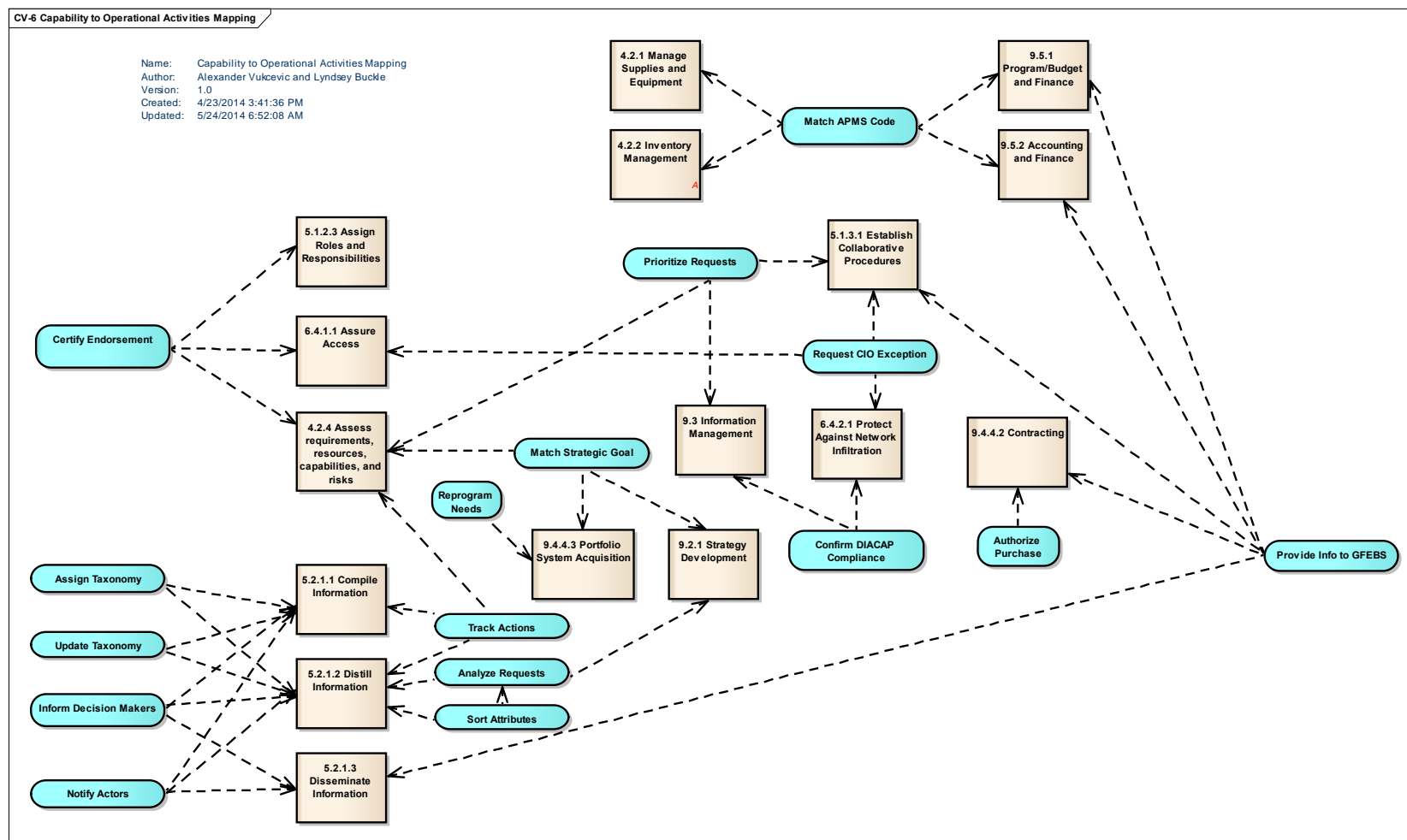
High Level Operational Concept Graphic (OV-1)



Capability Taxonomy (CV-2)



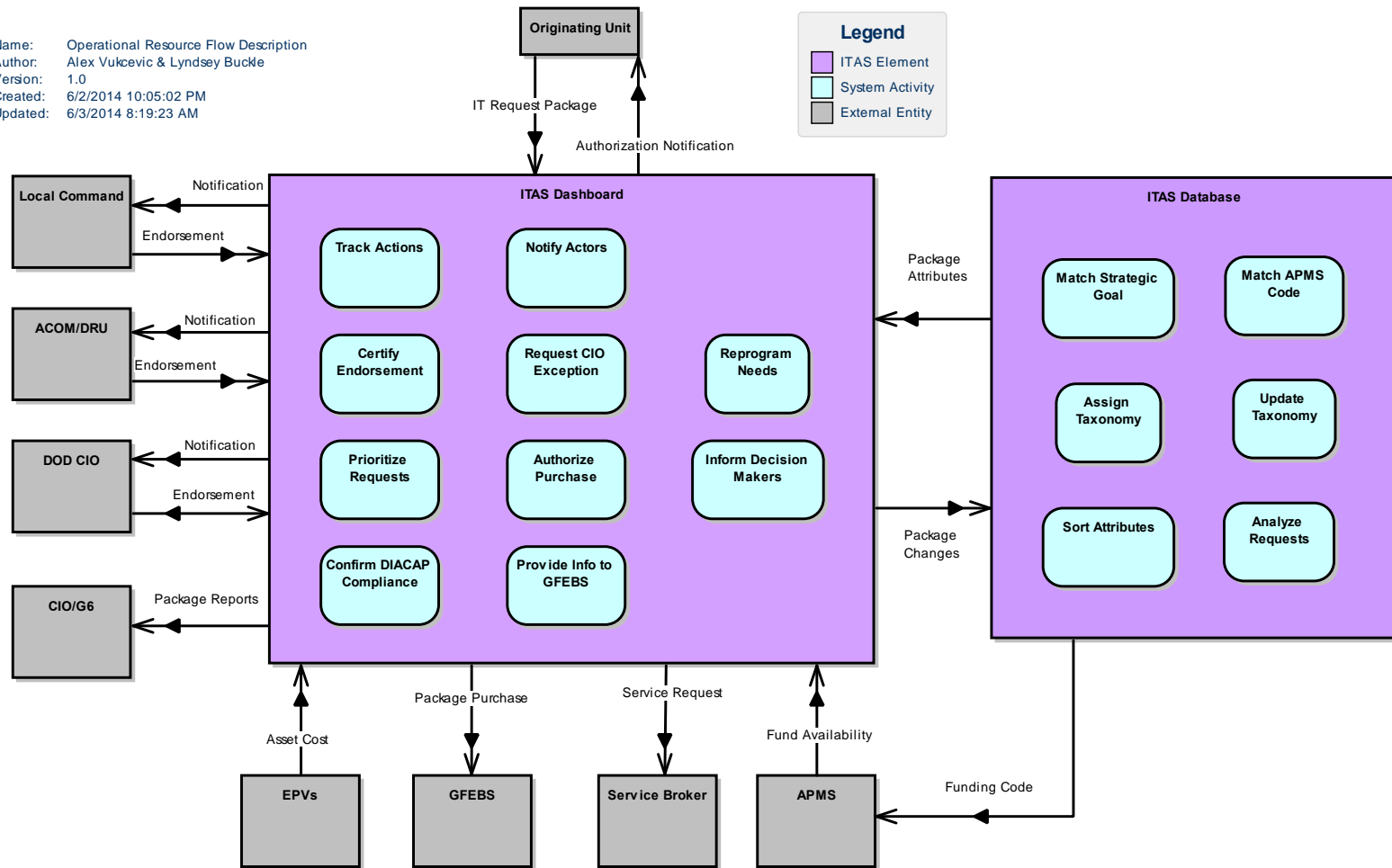
Capability to Operational Activities Mapping (CV-6)



Operational Resource Flow Description (OV-2)

OV-2 Operational Resource Flow Description

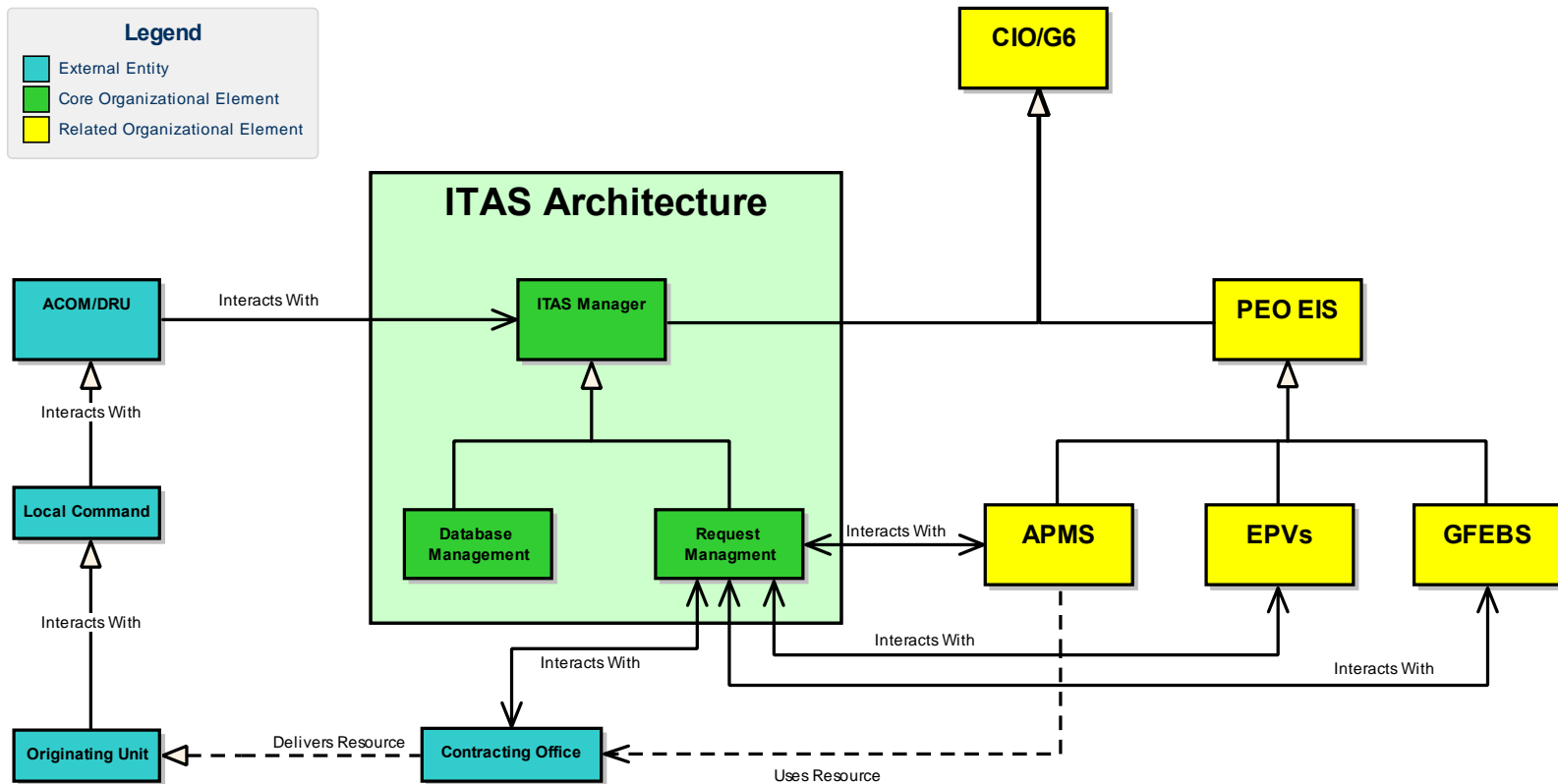
Name: Operational Resource Flow Description
 Author: Alex Vukcevic & Lindsey Buckle
 Version: 1.0
 Created: 6/2/2014 10:05:02 PM
 Updated: 6/3/2014 8:19:23 AM



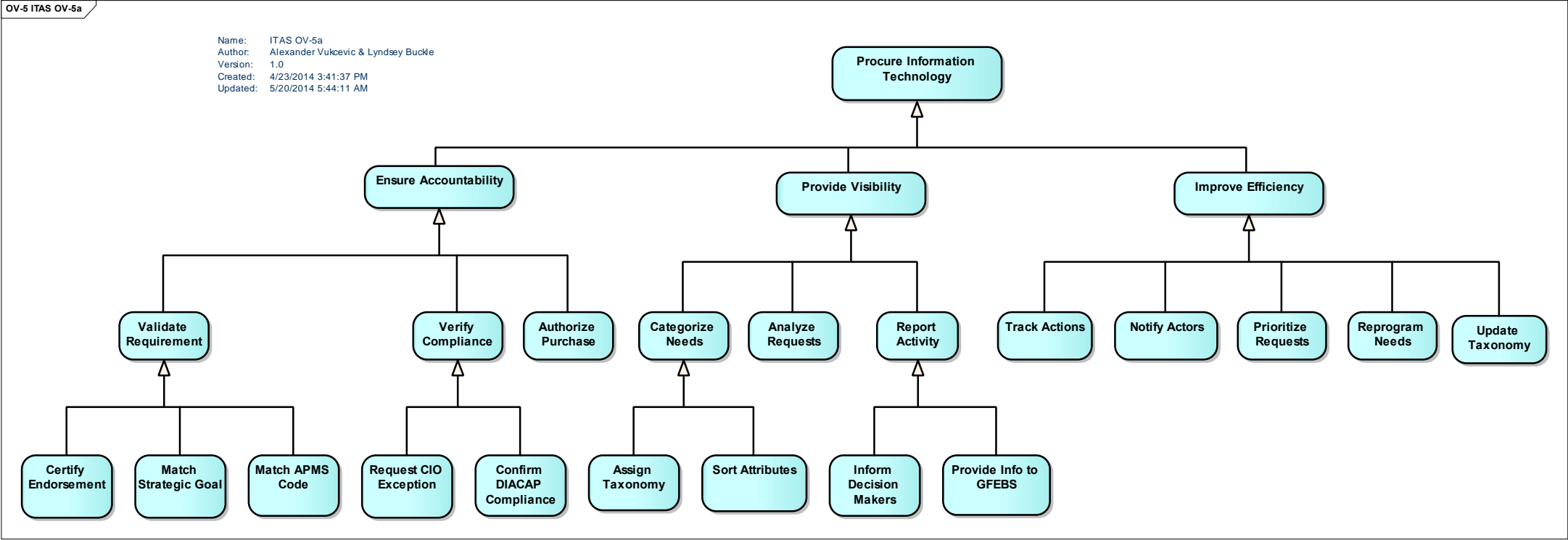
Operational Resource Flow Matrix (OV-3)

Connector Name	Connector Type	Conveyed Type	Conveyed Name	Producer Name	Consumer Name
Endorsement	Needline	EntityItem	Endorsement	Local Command	ITAS Dashboard
Endorsement	Needline	EntityItem	Endorsement	ACOM/DRU	ITAS Dashboard
Endorsement	Needline	EntityItem	Endorsement	DOD CIO	ITAS Dashboard
Package Reports	Needline	EntityItem	Package Reports	ITAS Dashboard	CIO/G6
Asset Cost	Needline	EntityItem	Asset Cost	EPVs	ITAS Dashboard
Package Purchase	Needline	EntityItem	Package Purchase	ITAS Dashboard	GFEBs
Service Request	Needline	EntityItem	Service Request	ITAS Dashboard	Service Broker
Fund Availability	Needline	EntityItem	Fund Availability	APMS	ITAS Dashboard
Package Changes	Needline	EntityItem	Package Changes	ITAS Dashboard	ITAS Database
Package Attributes	Needline	EntityItem	Package Attributes	ITAS Database	ITAS Dashboard
Funding Code	Needline	EntityItem	Funding Code	ITAS Database	APMS

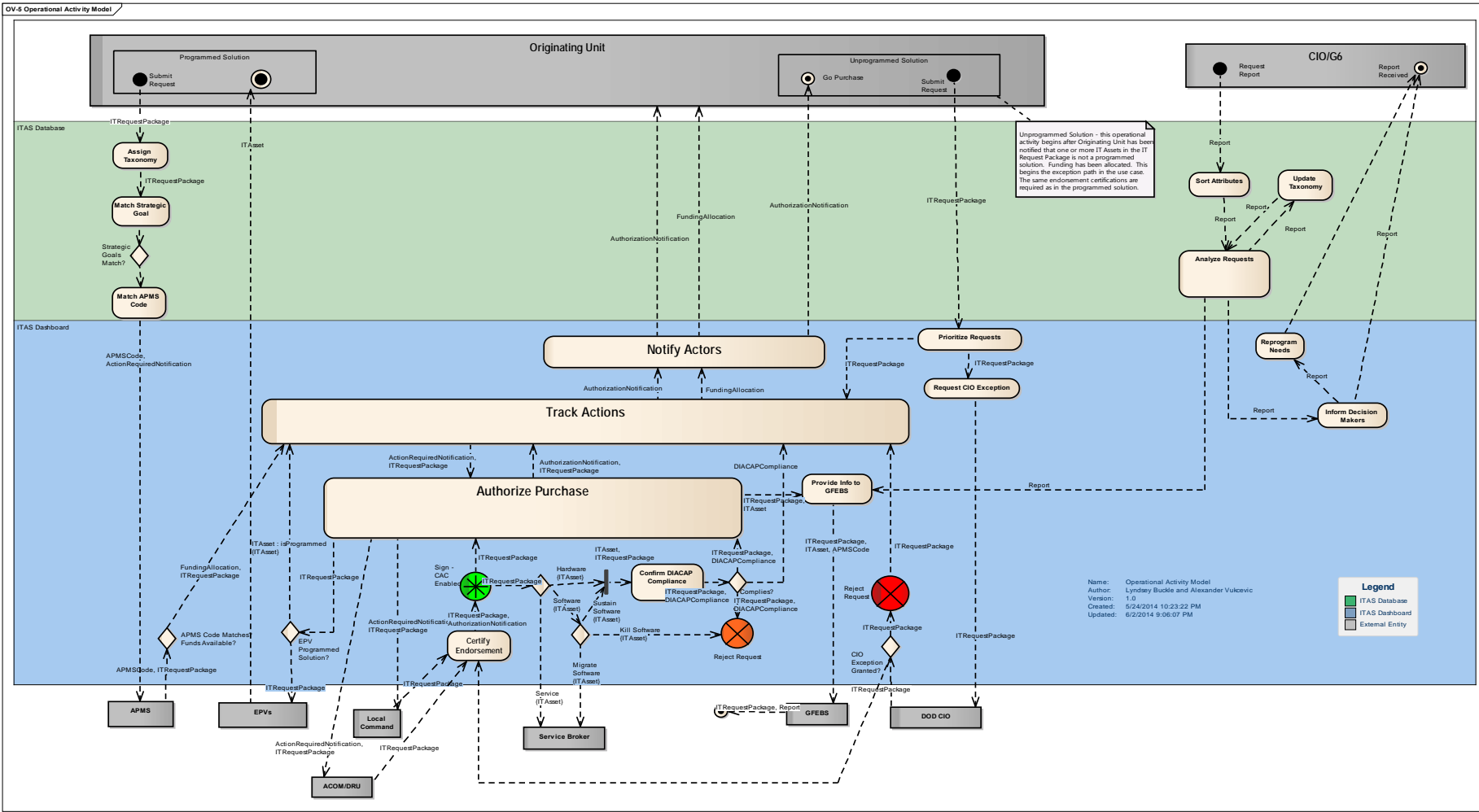
Organizational Relationships Chart (OV-4)



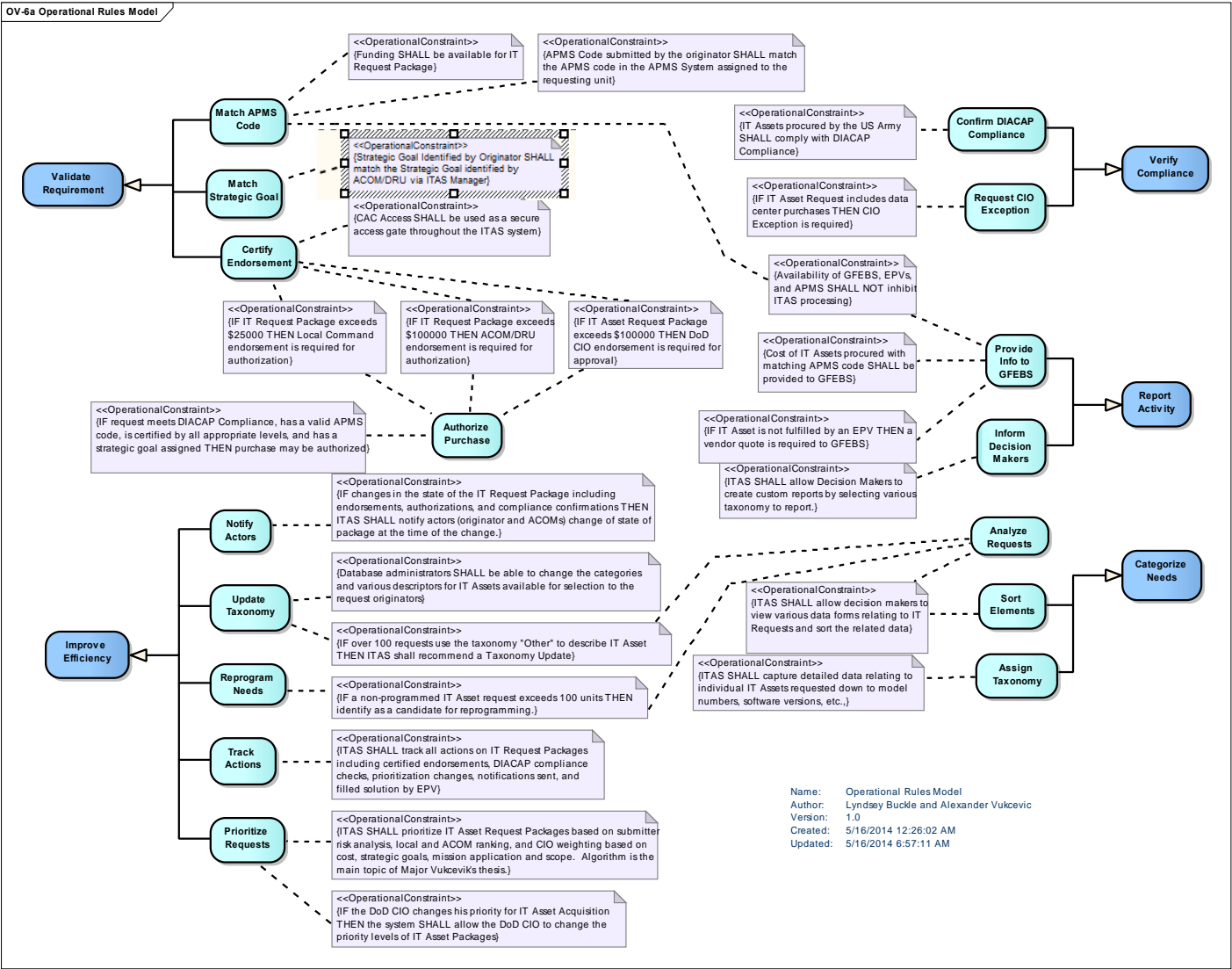
Operational Activity Decomposition Tree (OV-5a)



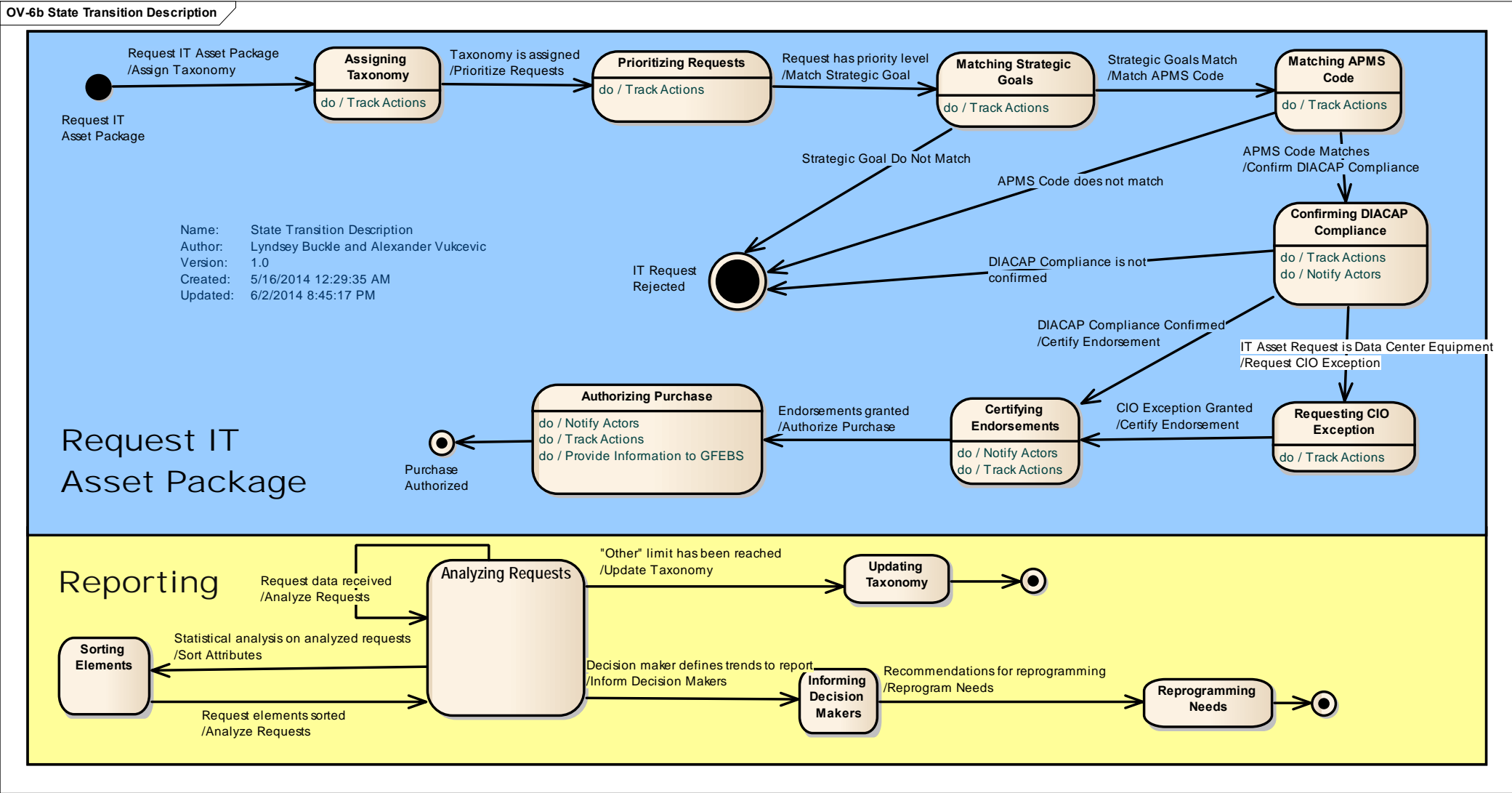
Operational Activity Model (OV-5b)



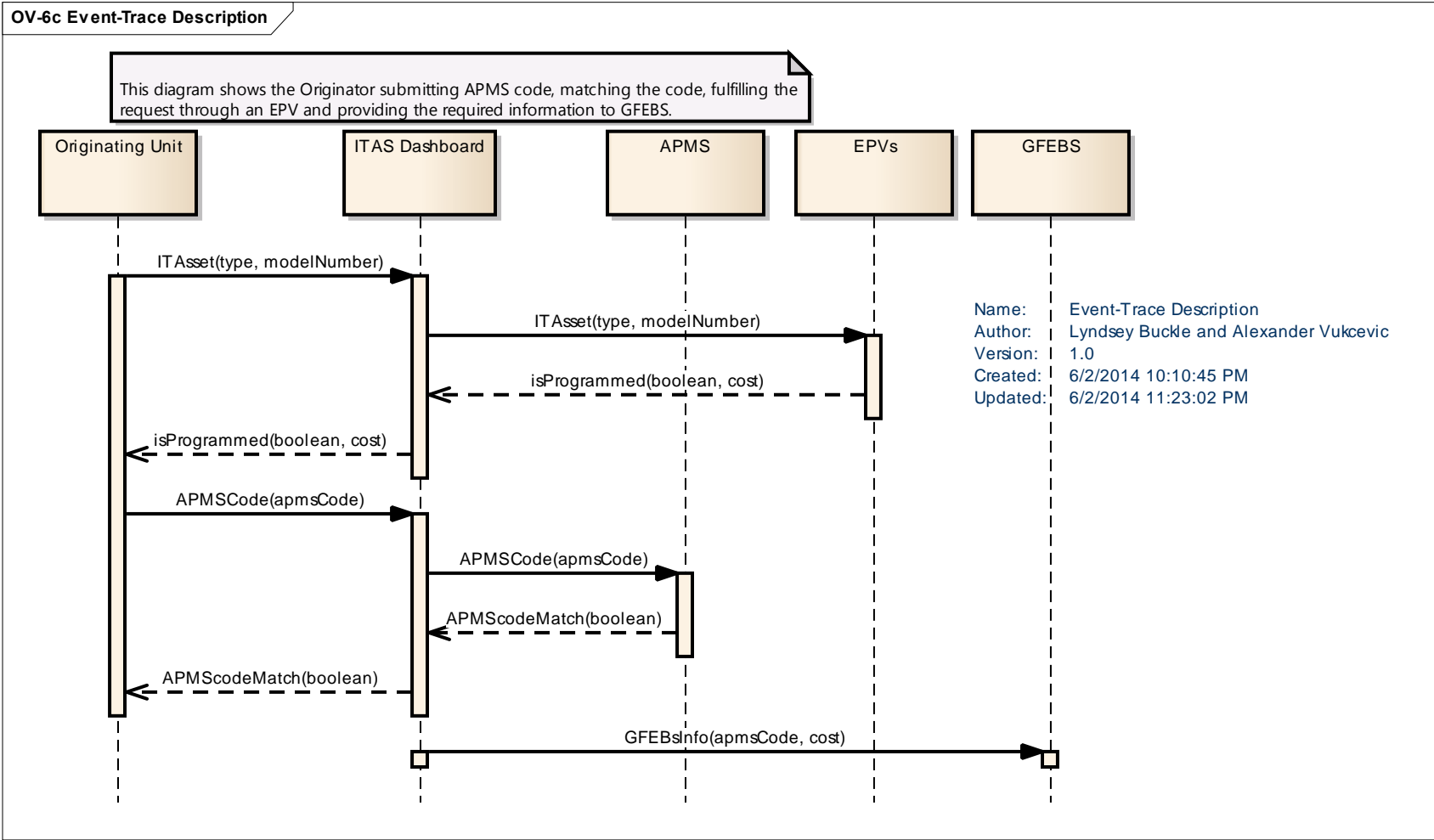
Operational Rules Model (OV-6a)



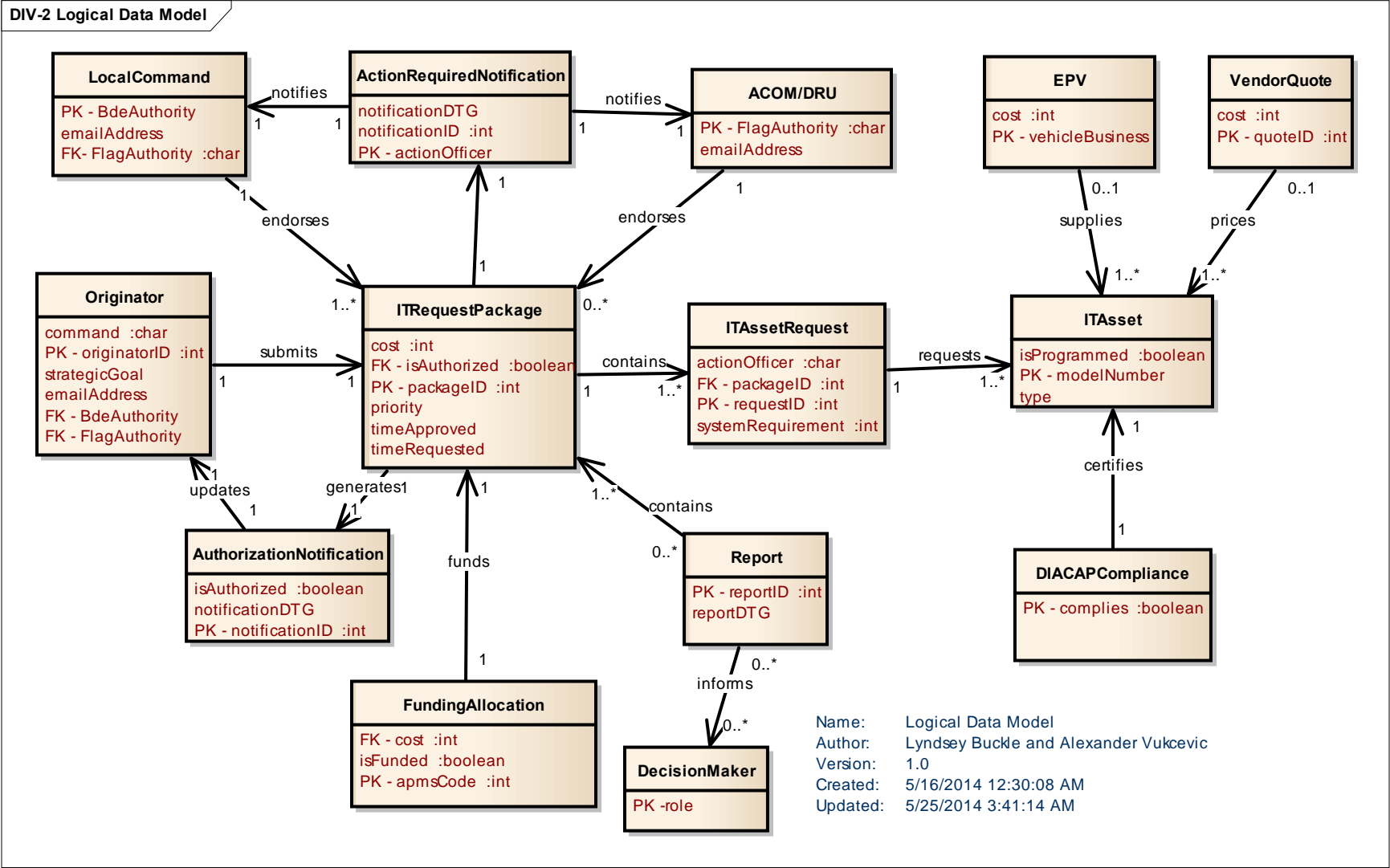
State Transition Description (OV-6b)



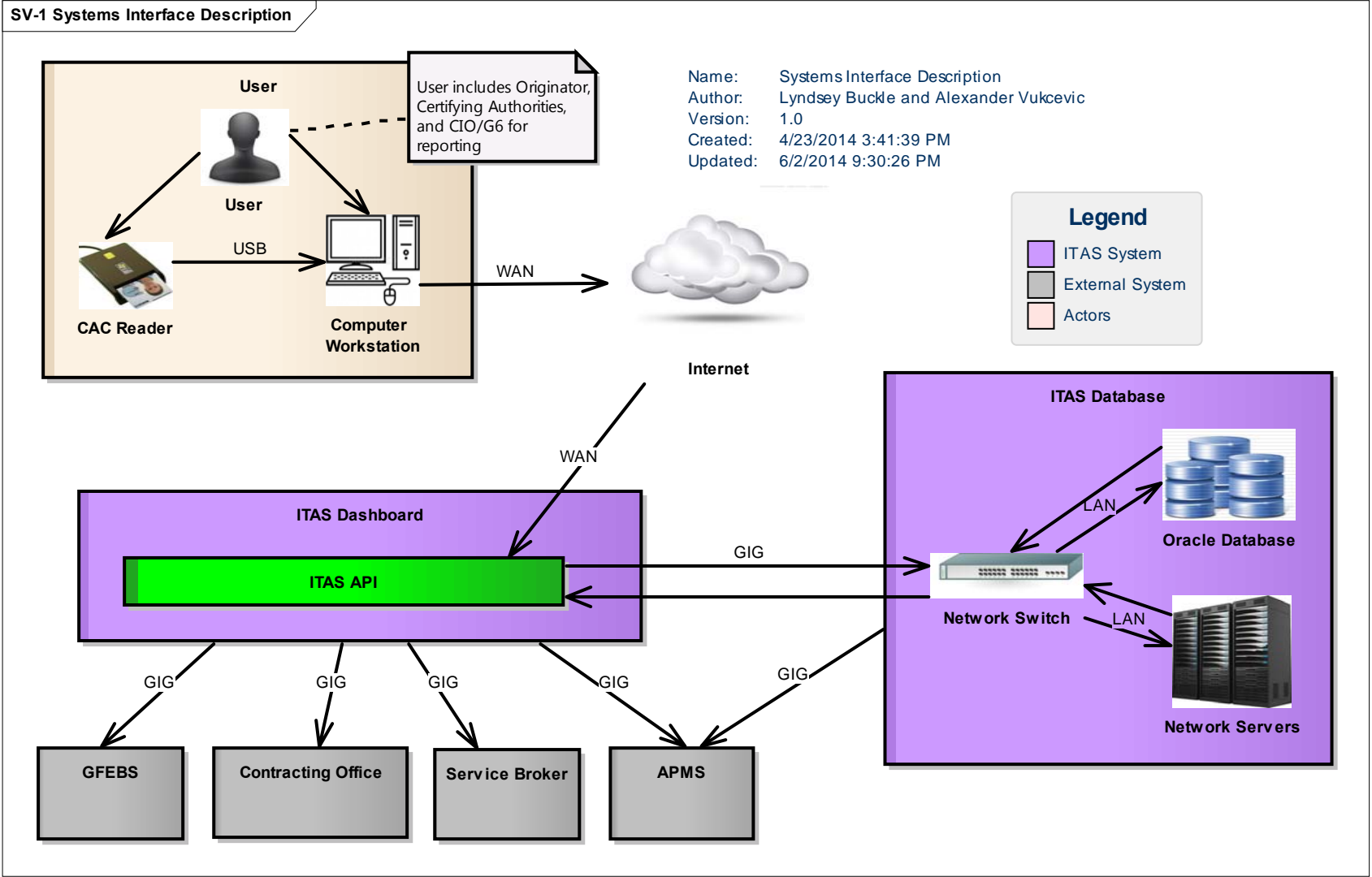
Event Trace Description (OV-6c)



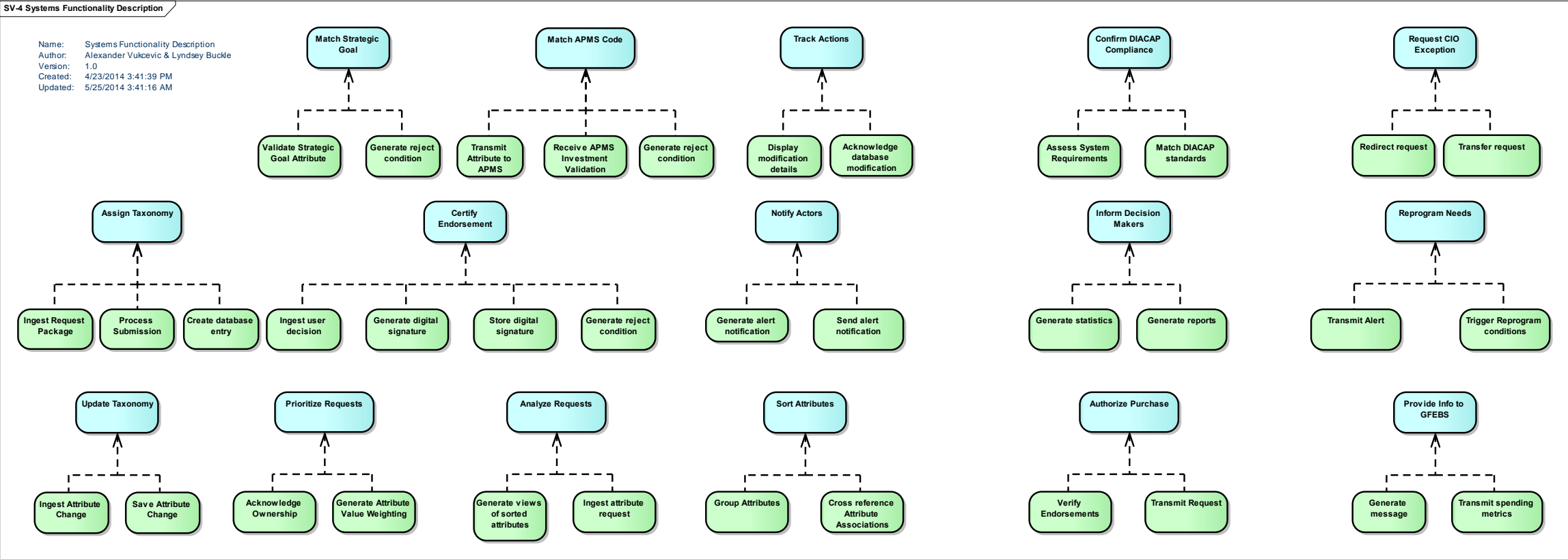
Logical Data Model (DIV-2)



Systems Interface Description (SV-1)



Systems Functionality Description (SV-4)



Operational Activity to Systems Function Traceability Matrix (SV-5)

	Send alert notification	Acknowledge database modification	Acknowledge Ownership	Assess System Requirements	Create database entry	Cross reference Attribute Associations	Display modification details	Generate alert notification	Generate Attribute Value Weighting	Generate digital signature	Generate message	Generate reject condition	Generate reject condition	Generate reject condition	Generate reports	Generate statistics	Generate views of sorted attributes	Group Attributes	Ingest Attribute Change	Ingest attribute request	Ingest Request Package	Ingest user decision	Match DIACAP standards	Process Submission	Receive APMS Investment Validation	Redirect request	Save Attribute Change	Store digital signature	Transfer request	Transmit Alert	Transmit Attribute to APMS	Transmit Request	Transmit spending metrics	Trigger Reprogram conditions	Validate Strategic Goal Attribute	Verify Endorsements
Analyze Requests					X												X			X				X												
Assign Taxonomy					X												X				X			X												
Authorize Purchase																																X				X
Certify Endorsement				X						X		X										X							X							
Confirm DIACAP Compliance				X																			X													
Inform Decision Makers														X	X											X										
Match APMS Code													X												X						X					
Match Strategic Goal														X												X									X	
Notify Actors	X							X																												
Prioritize Requests			X						X																											
Provide Info to GFEBS										X																							X			
Reprogram Needs																														X				X		
Request CIO Exception																										X			X							
Sort Attributes						X												X												X						
Track Actions		X					X																													
Update Taxonomy																			X								X									

Note: All technology exists and simply needs to be implemented for this purpose

- Mature Technology; full functionality readily achieved, TRL ~7-9
- Developing Technology; full functionality readily achieved, TRL ~4-6
- Undeveloped Technology; full functionality readily achieved, TRL ~1-3

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14. ABSTRACT This thesis presents a business process analysis of the Army's ICT procurement system. The research identified several inefficiencies and proposes several potential solutions. the contributions of this research include a unified taxonomy, a method to prioritize requests, and system architecture products for development of an automated and sustainable collaboration interface for the CIO/G6 to streamline their IT acquisition process. Development of a centralized system would reduce waste in the request process from submission to formal accounting, hasten the movement of requests between stakeholders, maintain a digital signature authorization for each approval authority, provide a reporting database to recognize reprogramming thresholds, and deliver relevant metrics and analysis to help inform the Army's IT resourcing decisions.					
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